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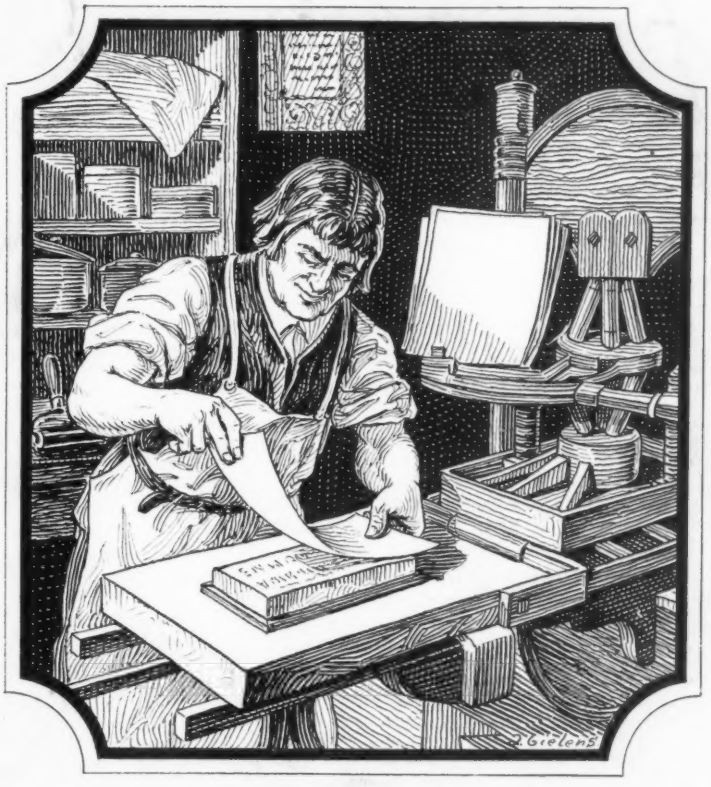
The INDUSTRIAL-ARTS MAGAZINE



JULY - 1926

The BRUCE PUBLISHING COMPANY
MILWAUKEE, WISCONSIN

MR. HAPPY MAN SAYS—

"If you had teeth
like an ATKINS SAW

and as good a temper
you'd 'cut up' more."

"You can tell an Atkins Saw by the way it CUTS,

Fast, Free and Easy

It pays to buy ATKINS SAWS."

Every supervisor should learn more about Atkins Silver Steel Hand, Rip and Panel Saws, Saw Tools, Saw Specialties, Hack Saw Blades and Frames, also Plastering Trowels, Coping Saws, Band and Circular Saws, etc., therefore send for

Atkins New Catalog and "Saw Sense"

E.C.ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

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Memphis	New York City	Seattle
Chicago	Portland, Ore.	Paris, France
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ATKINS ALWAYS AHEAD
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TRADE MARK
E.C.ATKINS & CO. INDIANAPOLIS, IND.

ATKINS SILVER STEEL SAWS

The Proper Finish for Projects of Wood

THE finishing of projects of wood is most important and should receive its full share of attention. Every Instructor of woodworking realizes that a beautifully constructed model may be ruined if improperly finished, whereas the defects of poor construction are minimized if the model is well finished.

For years we have kept our fingers on the pulse of progress of Industrial Arts and Vocational Education. We have striven to meet their Wood Finishing needs. That we have been successful is demonstrated by the fact that Johnson's Artistic Wood Finishes are used in nine-tenths of the schools in the United States and Canada. The endorsement of the world's foremost Instructors of Industrial Arts and Vocational Education is a convincing tribute to the merit of our products.

Our line of Artistic Wood Finishes is complete—it includes *Johnson's Wood Dye, Paste Wood Filler, Under-Lac, Polishing Wax, Varnishes, Enamels,* and *Undercoats.* They are all easy to apply—the youngest and most inexperienced pupils can use them with splendid results.

JOHNSON'S WOOD DYE

With Johnson's Wood Dye inexpensive soft woods may be finished so they are as beautiful and artistic as hardwood. All shades may be easily lightened or darkened. Directions on every label.

17 Beautiful Shades for STAINING WOOD

Johnson's Wood Dye penetrates deeply, bringing out the high lights of the wood without raising the grain. It is simple to apply—goes on easily and quickly without a lap or a streak.

FREE—*this valuable book*

Our new "Text Book on Wood Finishing for Instructors and Students of Industrial Arts and Vocational Education" is just off the press. Wouldn't you like a copy for each boy studying woodworking? We will gladly send the required number Free and Postpaid to Instructors who are using or will use Johnson's Artistic Wood Finishes in their woodworking shop. Use coupon at right.

We have a complete set of Wood Finishing Job Sheets (eight in all) which show job specification—job application—material—tools and equipment—procedure, etc. We will gladly send these Job Sheets postpaid and free of all charge to Instructors of Wood Finishing.

S. C. JOHNSON & SON, Dept. I. A 7. RACINE, WIS.
"The Wood Finishing Authorities"

We have ..... boys studying woodworking and would appreciate receiving the following material:

☐ *Wood Finishing Job Sheets*
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We buy most of our Wood Finishes from.....

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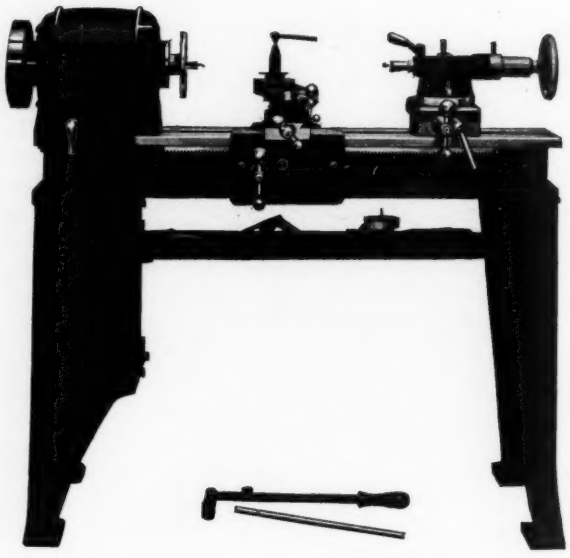
BLOUNT Motor Headstock LATHES



Utility!

Whether the student's work project be the simplest turning or the most expert pattern-making it can be accomplished on the Blount Motor Headstock Lathe with ease, rapidity, accuracy and a minimum of the instructor's valuable time. The range of practical instruction on the Blount Motor Headstock Lathe fitted with hand feed carriage, compound rest, and full setover swivel tailstock is virtually unlimited. Utility is paramount.

In attaining this wide utility there has been no sacrifice of other valuable features. Simplicity of design, sturdy, rigid construction, freedom from vibration, ease of operation and safety are characteristic of Blount Motor Headstock Lathes.

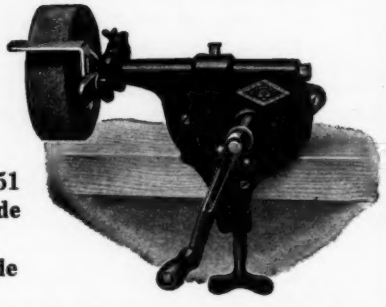
Descriptive catalog on request.

"Have proven their worth by their Service"

J. G. BLOUNT CO., EVERETT, MASS.

Sharpen Edge Tools on a LUTHER TOOL GRINDER

Ask for catalog and prices.



The No. 51 Best Maide is the Best Made

Manual training instructors, skilled mechanics, carpenters and pattern makers have found that Luther Grinders are the safest and most practical tool grinders made—excellent design and workmanship—a real quality product.

Grinder illustrated is our No. 51 Best Maide, ball bearing, swivel type hand grinder, equipped with combination (medium and fine) grinding wheel, especially adapted for grinding edge tools. No. 51 is equipped with 5x1½x⅞" DIMO GRIT grinding wheel and plain tool rest.

A special chisel and plane bit holding attachment can be furnished — insures uniform, accurate hollow ground bevel always.

LUTHER GRINDER MFG. CO.,
285 SO. WATER STREET,
MILWAUKEE, WISCONSIN.

TEACH THEM ON VISES They Will Eventually Use

Columbian Vises on the Instructor's Bench give students an advantage when they leave school and take up their various trades.

When they go to work, they find familiar tools to work with — almost everywhere.

You can equip all departments of your school with Columbian Vises. There is a type and size for every purpose.

Columbian Malleable Iron Machinists' Vise.

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Literature gladly sent to instructors on request.

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COLUMBIAN

You guide more than his hand when you give him Quality Tools

You teach him a trait that will serve him all his life in whatever vocation he chooses . . . Efficiency!

You teach him to prize those qualities of neatness—of accuracy—of saving time. You instill in him an appreciation for a job well done.

Do not let him struggle along with inferior tools . . . wasting time . . . bungling work.

But give him real tools. Tools that he can depend upon — that give him confidence to go ahead and do the job.

You can trust Disston Saws, Tools and Files in school. Many of them were developed for the use of the growing boy. They stand the strenuous service that a boy will put them to.

Write for information about Disston Quality Tools for Schools. Dept. L.

Free to you

A specification folder that saves you much time and work. It pictures, describes, and gives the order number of tools you need for school work. To make up your specifications for the new term you just fill in the quantity and indicate the size. Send for your copy.

HENRY DISSTON & SONS, INC.,
Makers of "The Saw Most Carpenters Use"
PHILADELPHIA, U. S. A.

DISSTON
SAWS TOOLS FILES KNIVES STEEL

Get Better Students' Work — Reduce Saw Upkeep Costs

WITH THE

FOLEY AUTOMATIC SAW FILER

Here are a few of the schools already using it:

Saginaw East Side Public School, Saginaw, Mich.
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State Normal School, Platteville, Wis.
McKinley High School, Canton, Ohio
Tarleton Agricultural College, Stephensville, Texas
Van Wert Public Schools, Van Wert, Ohio
Loveland Public School, Loveland, Colo.
Park Rapids Public School, Park Rapids, Minn.
Coles Memorial High School, Kurnoal, India
Normal School, Fresno, California
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Model F-4
Combination Hand and Motor Drive Machine for hand, band, back, or circular saws.

The "Foley" Files a Saw Perfectly in a Few Minutes

Students do better work when they have sharp saws to work with. The "Foley" puts a perfect cutting edge on every kind of a saw. Does away with costly hand filing and makes saws last longer. You'll be interested in full details about this remarkable machine. Write for them today.

Foley One-Minute Saw Set

One pull of the Foley Rotary Saw Set the length of the saw, sets the teeth perfectly. Takes just a minute.

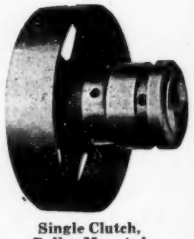
Foley Clamping Vise holds saw in a convenient position. Fastens to any bench

FOLEY SAW TOOL COMPANY

Room 401 Foley Bldg., 920 East Lake St., Minneapolis, Minn.

THE JOHNSON FRICTION CLUTCH

For Lineshaft Drives For Use In Schools



Single Clutch, Pulley Mounted

In your manual training department install a Johnson Lineshaft Drive. Then you can drive your machinery direct from the lineshaft. A clutch mounted over each machine. Every machine starts or stops independent of the others. Unit control. Each machine is run as the operator wills it.

The Johnson Lineshaft Drive saves extra belting, pulleys, hangers, etc. Means substantial power-saving, one-half less transmission equipment, one-half less friction, one-half less initial cost. Manual training supervisors and building committees invited to get our full illustrated data and blue prints. Install Johnsons in your schools.

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THE OLD WAY **THE NEW WAY**

Courtesy: The Bradley & Hubbard Mfg. Co., Meriden, Conn.

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A New Circular Saw That Rips or Cross-Cuts Equally Well

The Simonds Planer Saw gives results practically as smooth as a planer knife. Stands heavy hand feed on hard or soft wood. Will do all the work in any school woodworking shop.

Made 6" to 24" in diameter.

Specify Simonds Planer Saw when ordering.

SIMONDS

SAW and STEEL COMPANY

"The Saw Makers"

ESTABLISHED 1832 — FITCHBURG, MASS.

Chicago, Ill.	Lockport, N. Y.	Seattle, Wash.
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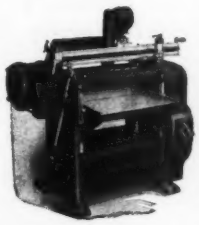
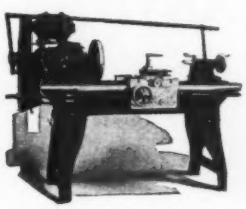
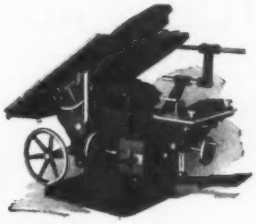
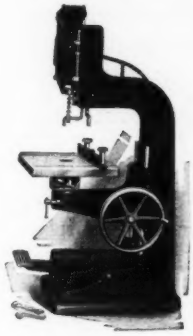
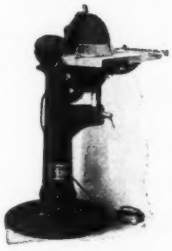
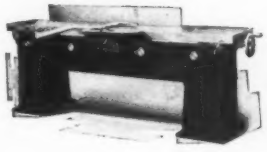
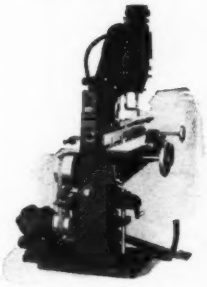
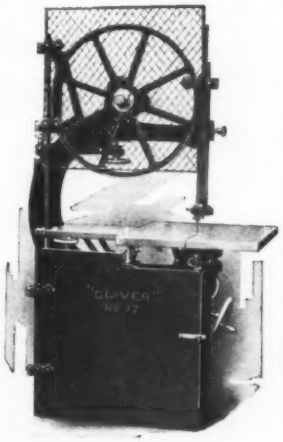
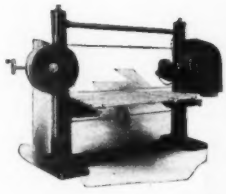
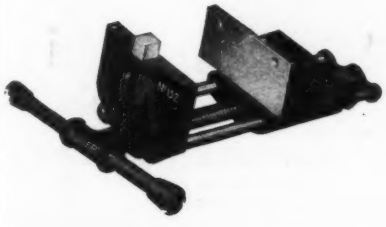
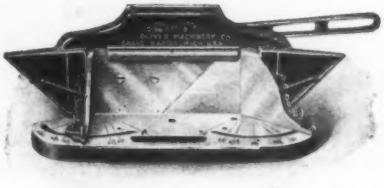
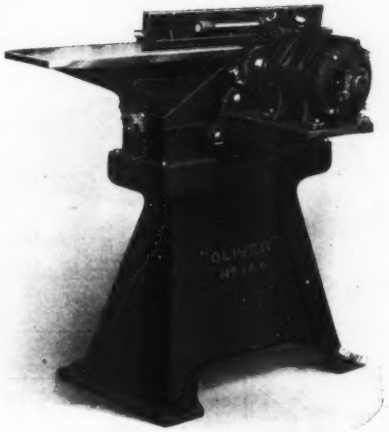









Oliver No. 144 6-inch Jointer. A prime favorite. Sturdy of build. Furnished with coupled or motor arbor drive.

Your inquiries for woodworking machinery are solicited. We seek the opportunity to work with you, to help formulate your plans. Our experience will be helpful.

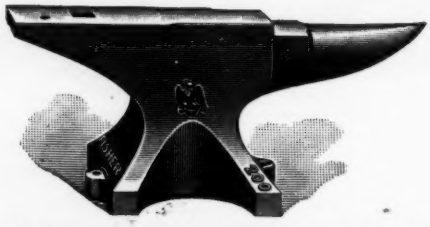
May we learn of your plans?

Oliver Machinery Co.

Grand Rapids, Mich.

THE "EAGLE" ANVIL

The standard anvil for Schools. No deafening ring. Lessons given and heard without interference.



A DECIDED PREFERENCE FOR USE IN MANUAL TRAINING SCHOOLS

— A FEW OF THE MANY USERS —

Tilden High School, Chicago, Ill.
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Mass. Institute of Technology, Boston, Mass.
Mechanics Arts High School, Boston, Mass.
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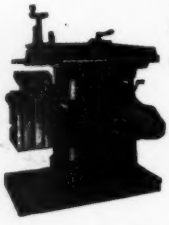
Manufactured Since 1843 by the Eagle Anvil Works

FISHER & NORRIS — TRENTON, N. J.

1845 — EIGHTY YEARS — 1925
Manufacturing Machine Tools

Thousands in use in shops all over the world giving daily satisfaction.

Meet the requirements of school shops because they are devoid of intricate parts and practically fool proof.

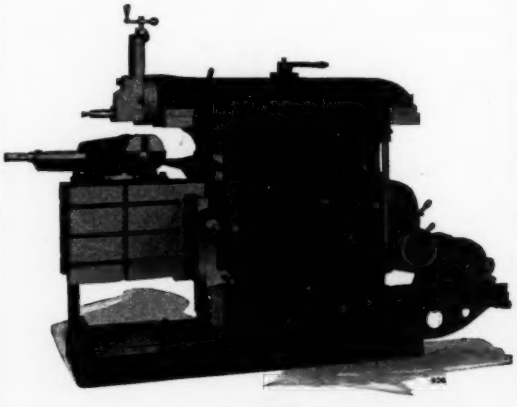


Send for catalogue describing the entire line of SHAPERS, MILLING MACHINES, LATHES and PORTABLE ELECTRIC SCREW DRIVER.

Industrial Education Dept.
THE JOHN STEPTOE CO.
CINCINNATI, OHIO

"OHIO" PLANERS and SHAPERS

Suitable for Tool Rooms, Production Shops and Vocational Schools.



The Ohio Machine Tool Co.
Planers and Shapers since 1887
— KENTON, OHIO —

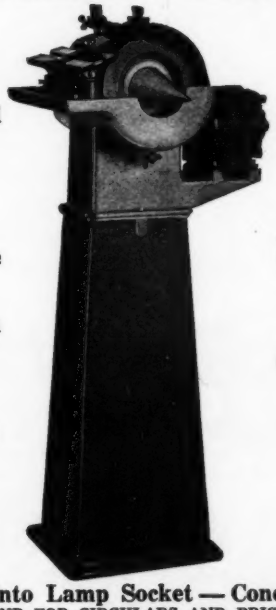
THE EFFICIENCY GRINDER
WILL PRODUCE A KEEN EDGE

A Real Tool — Built Right

Easy To Operate — Low Cost Operating

Moderate in Price — Sturdy in Construction

Bench Type — Pedestal Type



Plugs Into Lamp Socket — Cone Wheel
SEND FOR CIRCULARS AND PRICES
EFFICIENCY GRINDER COMPANY
2117 Rowley Ave.
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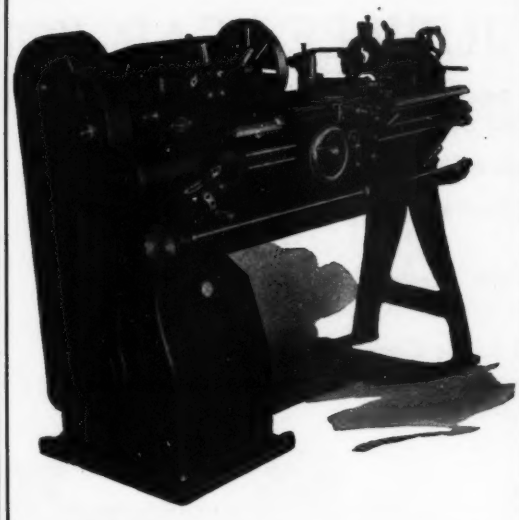
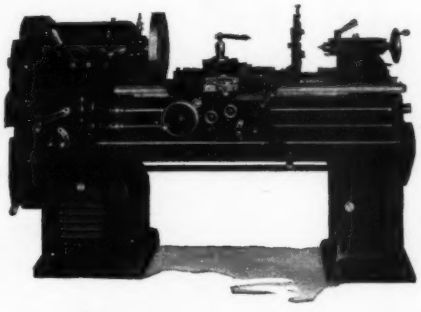
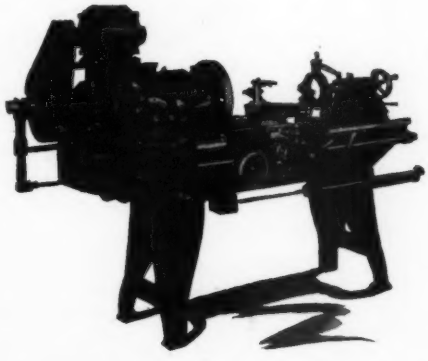


New 12-inch Geared Head Lathe illustrated above is one of our latest models. Embodies new ideas that make it quicker and more efficient. It has a wide range of speed variation. All speed variations are controlled by hand wheels always in front of operator.



Sidney 14-inch All-Geared Head, Heavy Pattern Lathe —a highly efficient and accurate lathe built for hard service. 8 speed all-geared headstock equipped throughout with S.K.F. ball bearings. All gears are high carbon steel, hardened and ground. Motor conveniently located in specially designed cabinet leg—out of the way.



Sidney 14 x 6 Medium Pattern Lathe—an especially efficient lathe for school use. Although it is simple in construction and low in price, it is equipped with 8 speed variations—quick change gear box—wide, deep mesh, all steel gears that are practically unbreakable—and direct connected motor.

School Room Lathes

—built for practical Machine Shop Use Safe, Speedy, Long Lived

Your students will have nothing to unlearn and learn over if they are taught on Sidney Lathes, for they are standard equipment in hundreds of machine shops throughout the country.

Both schools and production shops everywhere are coming to the geared head type of lathe. They are speedier, safer, and more satisfactory in many respects.

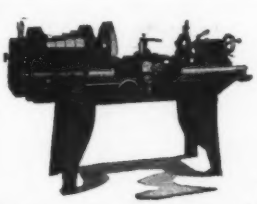
For schoolroom use their safety is especially desirable. There are no belts to endanger the student. All moving parts of the transmission are covered.

Sidney Engineers are at your service. Ask them about your equipment and shop layout problems. Their advice is free. Illustrated bulletins on any machine sent free on request. Address Dept. 407.

The Sidney Machine Tool Co.
Sidney, Ohio

SIDNEY

Built



Cone Head Lathes

For those who prefer the old type cone head lathe we make a full line of Sidney Cone-Head Lathes—each built in the same accurate, rigid, serviceable way as the geared head line. Send for illustrated bulletin.

Little Giant Band Saw

1876-GOLDEN JUBILEE YEAR-1926

Good Reputation of 50 years growth is built into the Little Giant Line of Lathes and Band Saws;

50 years of conscientious effort;

50 years of growth of plant and of organization and ambition to excel;

All these are put into the Little Giant Lathes and Band Saws.

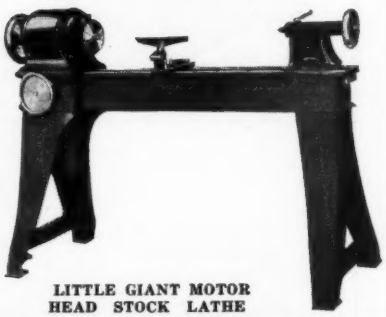
As a result we offer the Little Giant Line to the Schools of the United States, as perfect Shop Tools, as Tools in the forefront of Shop equipment.

To prove this we allow 30 DAYS FREE TRIAL

Send for our New Free Catalog.

Little Giant Company

223 Rock St. **Mankato, Minnesota**



LITTLE GIANT MOTOR HEAD STOCK LATHE

Teach them *the Modern Way*

Every school teaching modern woodworking plant practice should be equipped with modern woodworking machines. By modern woodworking machines we mean machines that cost less, and operate more economically—permit maximum production, and are more accurate—occupy less floor space, and are portable.

Union Woodworking machines embody the most up-to date methods employed in modern woodworking shop practice, and are built to the highest standards of quality. *Write for Catalog.*

GALLMEYER & LIVINGSTON CO.
214 Straight Ave., Grand Rapids, Mich.

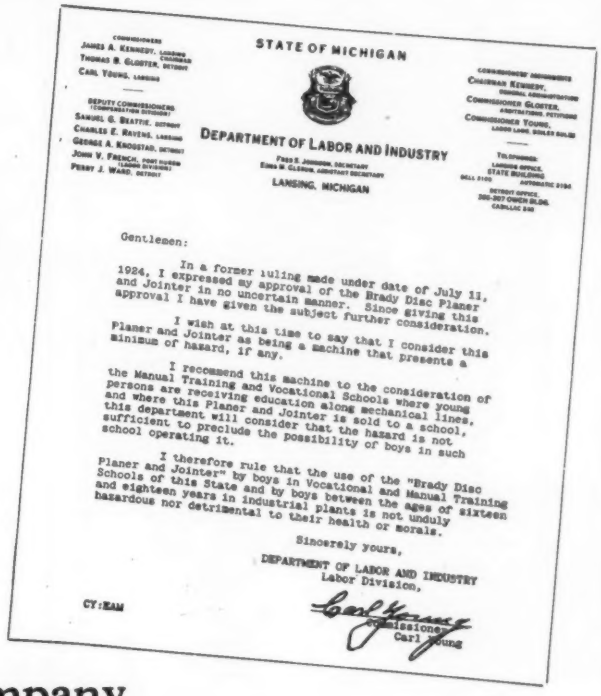
UNION PORTABLE AND BENCH TYPE WOOD WORKING MACHINES

The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self feed rip saw.

THE CRESCENT MACHINE CO.
25 Main St.,
LEETONIA, OHIO.

Approval of this New Type of Woodworking Machine



STATE OF MICHIGAN

DEPARTMENT OF LABOR AND INDUSTRY

LANSING, MICHIGAN

Gentlemen:

In a former ruling made under date of July 11, 1924, I expressed my approval of the Brady Disc Planer and Jointer in no uncertain manner. Since giving this approval I have given the subject further consideration.

I wish at this time to say that I consider this Planer and Jointer as being a machine that presents a minimum of hazard, if any.

I recommend this machine to the consideration of the Manual Training and Vocational Schools where young persons are receiving education along mechanical lines, and where this Planer and Jointer is sold to a school, this department will consider that the hazard is not sufficient to preclude the possibility of boys in such school operating it.

I therefore rule that the use of the "Brady Disc Planer and Jointer" by boys in Vocational and Manual Training Schools of this State and by boys between the ages of sixteen and eighteen years in industrial plants is not unduly hazardous nor detrimental to their health or morals.

Sincerely yours,

DEPARTMENT OF LABOR AND INDUSTRY
Labor Division,

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Commissioner
Carl Young

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Brady Machinery Company

Traverse City Michigan

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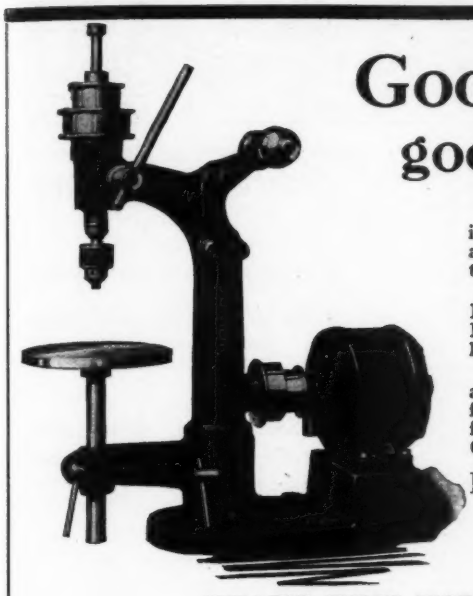
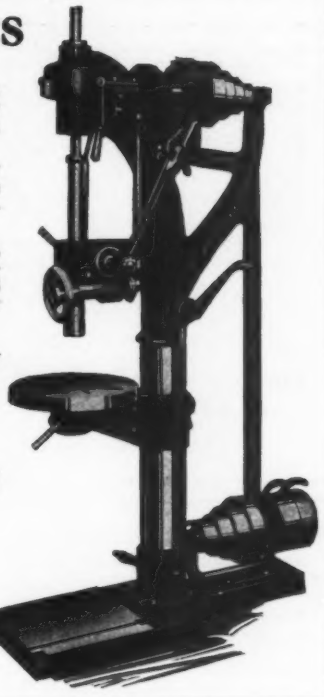


Good tools help make good mechanics



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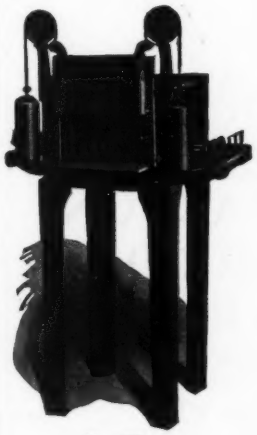

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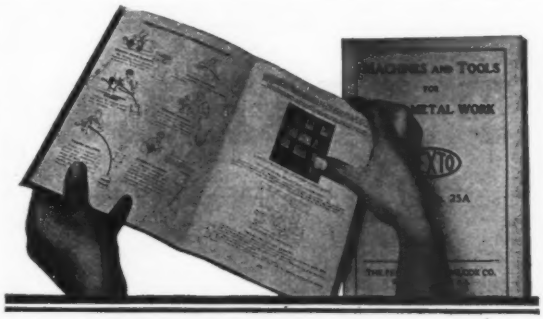

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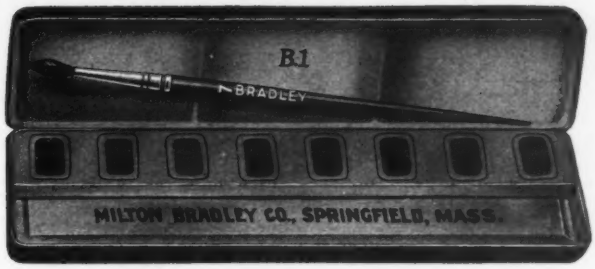

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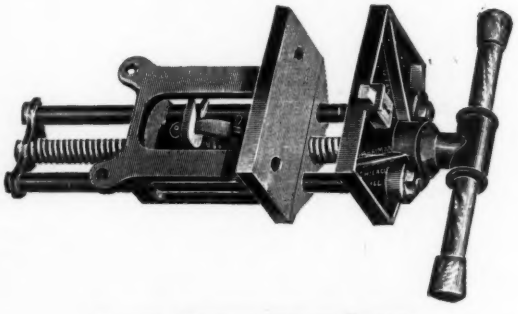

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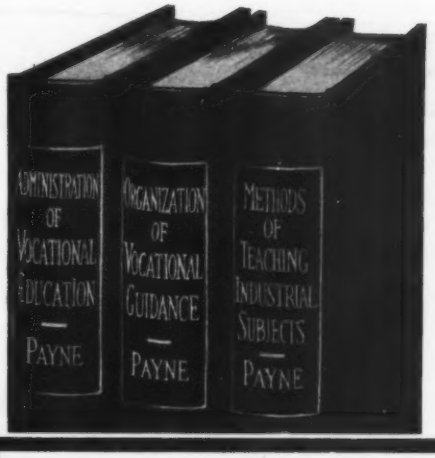

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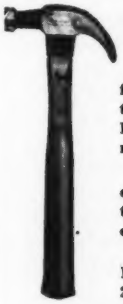

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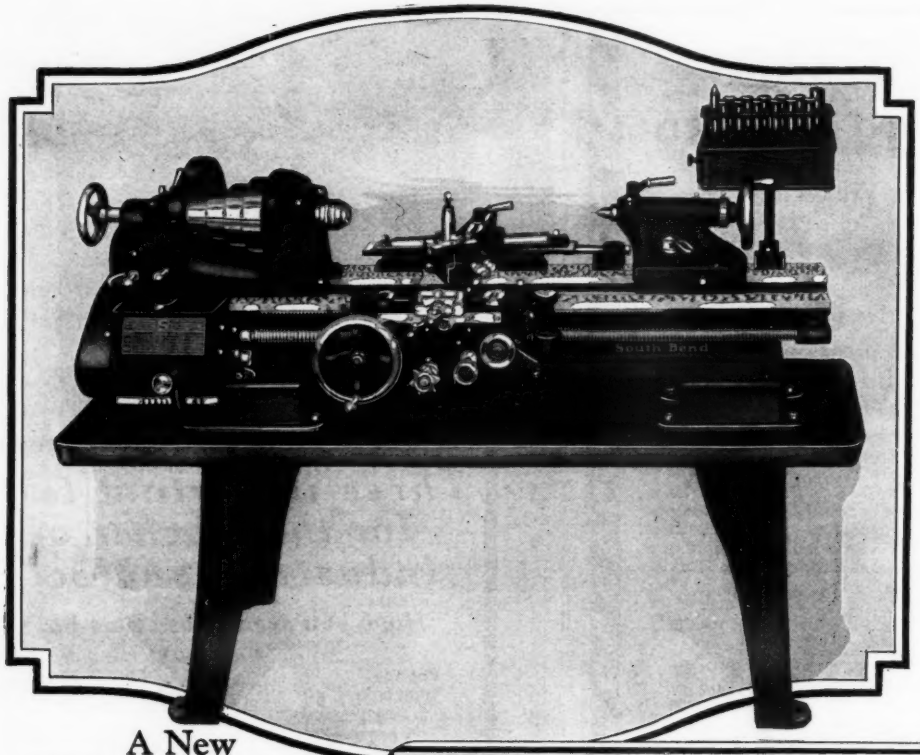

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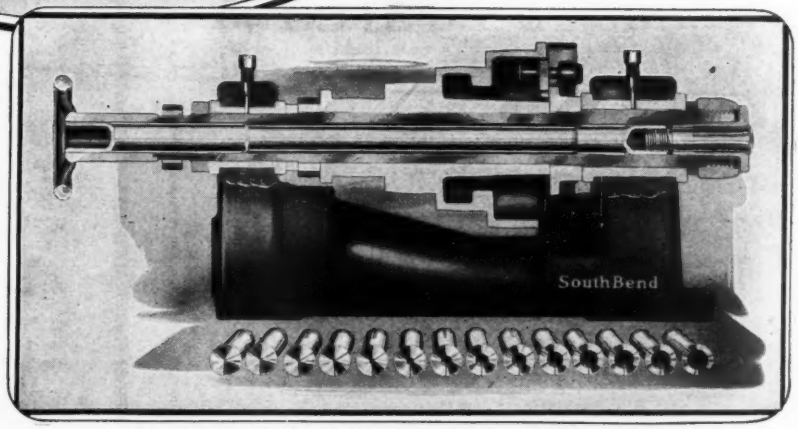

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Vol. XV
No. 7

INDUSTRIAL-ARTS MAGAZINE

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NO REST IN THE SUMMER

In years past, it was the custom for educational magazines to shut down for the summer vacation. It was the popular belief that teachers would not read professional papers and that the editors might also enjoy a period of rest and recreation.

The editorial offices of the Industrial-Arts Magazine are as busy during June, July, and August as they are during December and January. Not only are the current issues prepared for each of the summer months, but a vast amount of planning and preparatory work is going on for the fall and winter.

It is our experience that the Industrial-Arts Magazine is read carefully during the summer because its readers, like all serious minded teachers, do not take a vacation from their profession but use the summer to store up new strength and new ideas for the coming school year.

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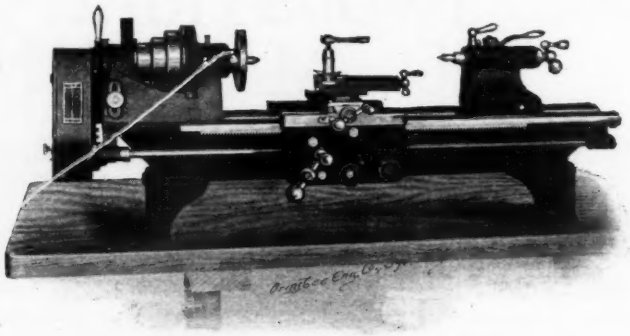

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THE INDUSTRIAL ARTS MAGAZINE

Volume XV JULY, 1926 Number 7

An Experiment in Self-Rating Shop Products

Robert E. Smith and Herbert A. Toops, Ohio State University

CAN a student do a good quality of shopwork if he cannot judge the quality of his own work? Can a student improve the quality of his work unless he improves at the same time his judgment of the quality of his work? Can students judge as well as instructors? Do instructors agree perfectly with each other as to which students should have the A grades, which the C's, and which the E's? Can success in shopwork be rated as accurately as success in academic subjects? As students progress in their course, do they progressively agree better with the instructor's judgment? Does formal self-rating lead the student to settle down to a steadier quality of work, than if he were not required to do formal self-rating of his products?

In attempting to determine some of the effects on a student's marks of having him rate his own work, the following experiment was conducted in the patternmaking course of Ohio State University during the autumn quarter of 1924-1925:

The Selection of the Experimental and Control Groups

Two groups in the patternmaking course were used in the experiment, one group, consisting of 21 students, known as the experimental group, and the other, consisting of seventeen students, known as the control group. No special selection of subjects was made for either group, both groups being assigned to their respective classes through ordinary channels, by the university registrar and were, therefore, to that extent, a random selection. In an experiment of this nature, it is highly desirable that each group be so selected that each has the same ability to make progress. This would not be equal intelligence as required in an academic experiment, but rather equal "mechanical ability." If the two groups are of equal initial mechanical capacity, any apparent greater relative improvement of the experimental group, which is to do self-rating, over the control group will be due to the self-rating, rather than to a possible greater relative initial ability on the part of the experimental group. Such selection ideally means that for every student in the experimental group there would be paired off a corresponding student of identical initial test ability in the control group.

The first project of both groups was rated by the instructor. One group was superior in average score by one and two-tenths points, or eight per cent, to the other on this first project. The group making the lower average was selected as the experimental group. If one group is inferior, this group should become the experimental group. If self-rating has any value, it should be able to overcome the handicap of initial inferiority.

The Method of Conducting the Experiment

During the process of scoring, the scorer had no means of knowing whether the project being scored was of the control group, or of the experimental group.

The projects of each group were first *numbered,* in random order, by an instructor other than the scorer. This was necessary in order that the projects might be identified upon occasion and returned to the owner, and also for recording cumulatively each student's record on the several projects.

After the models of Projects No. 1 had all been scored by the scorer, those of the experimental group were returned to their owners for self-scoring.

The Standard Self-Scoring Blanks

In order that each student-scorer might score his product on the same basis as the instructor, both students and instructor-scorers rated all products, including the first, by means of standard self-scoring blanks, or rating scales. These specify the credit to be given for each degree of merit on each subdivision of the total project. They preclude the possibility of making overall or snap judgments of the total projects by requiring a judgment to be made on each part of the total project.

These rating sheets were worked out for each individual project by the instructor, and submitted to another expert for his criticisms and suggestions. The revised rating sheets were then mimeographed. The method of determining the values for the rating sheets was an arbitrary one. It was assumed that the course would include a total of seven projects and these were assigned a total of 100 points. Each project was then allotted a fractional part of the 100 points decided by the criteria; (a) difficulty of the operations involved in its construction; (b) provisions required for adequate draft and finish; (c) the relative importance of key dimensions.

A great deal of thought and care was given to the making of the rating sheets, as it was highly desirable that not only should the rating sheets be valid, but also that they be readily understood by the student and should give him the minimum amount of difficulty in

scoring, with maximum economy of time and labor. As can be seen by observing the sample rating sheets, instructions to the student for rating the projects are quite definite and detailed. This is necessary in order that there should be a minimum of misunderstanding and consequent likelihood of mistakes in rating the projects.

Sample rating sheets follow.

Name..... Course.....
Section..... Date Scored.....

Project No. 1—Pulley Arm
Student's Self-Scoring Blank

Scoring Values. **Summary** of Maximum Points Allowed		Student's Score	Instructor's Score
Correct spacing of arms	3 points	A.....	.....
Accurate joints at center	6 points	B.....	.....
Width of arms at the throat	2 points	C.....	.....
Thickness of the arms at the throat.	2 points	D.....	.....
Thickness of the pattern at the hub.	1 point	E.....	.....
Thickness of the arms at the rim...	1 point	F.....	.....

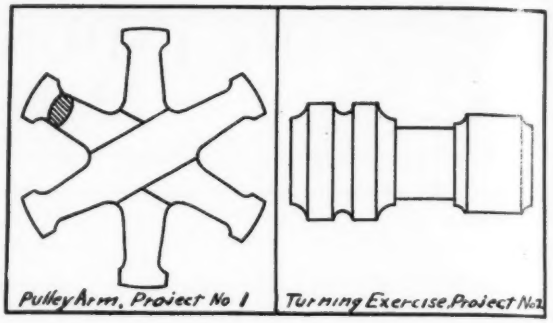
Total possible score.....15 points

Instructions for scoring. (Follow the directions below; write the score on the lettered blank provided.)

1. **Check spacing of arms.**
   If the arms of a pulley are not equally spaced, the wheel will run out of balance, with the result that vibration in the machinery will lead to excessive wear, noise, and possible accident by the bursting of a wheel. Also unequal spacing will affect the internal strain of the cast pulley due to unequal shrinkage of the metal in cooling.
   With your dividers check the spacing of the arms from C.L. to C.L. on the 10" layout circle. Note that the distance from C.L. to C.L. is the radius of the layout circle. A variation of $\frac{1}{32}$" ± from the correct measurement is permissible.
   All 6 measurements correct within permissible limit ..... 3 points A.....: Score
   Only 5 measurements correct within permissible limits ..... 2 points
   Only 4 measurements correct within permissible limit ..... 1 point
   Three or less measurements correct within permissible limit..... 0 points
   Caution on bad workmanship: An easily avoidable bad error is that of allowing the divider point to sink deeply into the wood at the center of the layout circle, thus making accurate layout from this center impossible.
2. **Check joints at center.**
   A joint, either filled with glue or open, showing an opening greater than .01 of an inch cannot be considered accurate. A glued joint will not hold unless the two pieces of wood closely adhere.
   There are six joint lines showing on each side of the project. Inspect each joint carefully. For each of the twelve joints within the permissible limits, allow one-half point credit each. Maximum total, six points. For each joint showing an opening greater than the permissible error subtract one-half point from the total possible six points.
   B.....: Score
   If there is one or more joints with an opening as large as $\frac{1}{64}$" or greater, so that the inspector or shop foreman would not pass the job **unless filled with a piece of wood**, subtract from the above discounted score an **additional** half point for **each** such extreme error. No score lower than zero is to be recorded.
3. **Caliper the width of each arm at the throat.**
   The proper proportions of pulley arms have been carefully determined by engineers. Variations in size either weaken the pulley, destroy the balance, or violate the standard.
   The correct width of the arm at the throat, the "smallest part of the arm," is approximately $1\frac{1}{16}$". A variation from the correct measurement of $\frac{1}{32}$" ± is permissible.
   All 6 measurements correct within limit ..... 2 points C.....: Score
   Only 5 measurements correct within limit ..... 1 point
   4 or less measurements correct within limit ..... 0 points
4. **Caliper the thickness of each arm at the throat,** or "thinnest part of the arm." Permissible error, $\frac{1}{32}$" ±, correct thickness, one-half inch.
   All 6 measurements correct within limit ..... 2 points D.....: Score
   Only 5 measurements correct within limit ..... 1 point
   Four or less measurements correct within limit ..... 0 points
5. **Caliper the thickness of the pattern at the hub.**
   Permissible error $\frac{1}{32}$" ±. Correct thickness ¾".
   Measurement correct within limit.... 1 point E.....: Score
   Measurement varies more than $\frac{1}{32}$" ± from correct measurements, 0 points.
6. **Caliper the thickness of each arm at the rim where the arm enters the segments.**
   Permissible error $\frac{1}{32}$"+. Correct thickness, ¾".
   All 6 measurements correct within limit ..... 1 point F.....: Score
   Only 5 measurements correct within limit ..... 0 points

After recording the above six scores carefully copy them into the **summary** spaces at the top of the first page. Hand the paper to the instructor. In case the instructor differs much from you in his scoring of your product, he will advise you.
"Skilled workmen are good judges."

Name..... Course.....
Section..... Date Scored.....



PLAN VIEW OF TWO OF THE FOUR PROJECTS MADE BY TWO GROUPS OF STUDENTS.

Project No. 2—Exercise in Wood Turning
Student's Self-Scoring Blank.

Scoring Values. **Summary** of Maximum Points Allowed		Student's Score	Instructor's Score
All 9 diameters correct	3 points	A.....	.....
All 9 lengthwise dimensions correct.	3 points	B.....	.....
Over all dimension correct	½ point	C.....	.....
Contour of 5/8" groove	⅓ point	D.....	.....
General appearance of finished product	⅓ point	E.....	.....

Total possible score..... 7 points

Instructions for scoring. (Follow the directions below; write the score on the lettered blanks provided.)

1. **Caliper diameters.**
   There are nine diameters on the project given on the blue print provided. Caliper each one carefully. A variation of $\frac{1}{32}$" ± D. is allowable. Allow ⅓ point for each diameter correct within permissible limit.
   A.....: Score
   Caution: In calipering work, the calipers must be held perpendicular to the axis of the work, otherwise the measurement will not be accurate. Furthermore, the calipers must *not be forced over the work* because the calipers may spring, or they will cut a groove into the work, or the points of the calipers may be forced farther apart. Any one of the above conditions will result in inaccurate measurement.
   Unless one is careful when calipering work revolving in a machine, any of the above mentioned things may happen; and in addition, the calipers may catch, thus causing a serious accident, either to the operator or a fellow workman. "Safety First."
2. **Check all lengthwise dimensions.**
   Accurate work cannot be expected, if the work has not been accurately laid out, or spaced.
   There are nine given lengthwise dimensions on the project, as follows: ⅜", ¾", 5/8", ⅞", ⅜", 1½", ¼", 1½", ¾". With your scale, or rule, measure each dimension. A variation of $\frac{1}{64}$" ± is permissible.
   For each measurement correct within permissible limit, allow ⅓ point. B.....: Score
3. **Check over all dimensions.**
   With your calipers measure the over-all dimension. A variation of $\frac{1}{64}$" ± is permissible.
   If the over-all dimension is correct within permissible limit allow ⅓ point.
   C.....: Score
   N. B.—In laying out work from a blue print, it is good practice to check your intermediate spacings or measurements by the over-all dimension. The sum of the nine successive intermediate measurements above must equal the over-all dimension. **Blueprints sometimes** have **errors** in them.
4. **Check contour of 5/8" groove.**
   Examine the 5/8" groove carefully; the groove should be a good half circle, not an oval.
   If the shape of the contour is correct allow ⅓ point.
   D.....: Score
   If contour is of poor character, score 0.
   N. B.—When a single radius is given the resulting curve, if correctly made, is a circle, or section of a circle. An ellipse, oval, or other variation cannot be considered accurate.
5. **Check the finish.**
   If general finish, as to smoothness of finished surfaces, sandpapering, straightness of line in straight lines and smoothness of curves in curve lines, and absence of marks caused by tool chattering, come up to a workmanshiplike standard, give a credit of ⅓ point. E.....: Score
   If finish is of poor character, score 0.
   N. B.—Blemishes in the original stock, for the production of which the workman is in no wise responsible, should not be counted against him in the finished product. A good workman always plans, in the layout of his work, to make the blemished part of stock come on a part of the project which **will be cut away** in the process of construction of the product. Where this is impossible he plans the layout so that the blemish will **not appear on any exposed finished surface.** The value to the employer of a workman depends in part upon his ability to work up slightly blemished stock into an acceptable, apparently blemishless, finished product.
   After recording the above four scores, carefully copy them into the summary spaces at the top of the first page. Hand the paper to the instructor. In case the instructor differs much from you in his scoring of your product, he will advise you.
   "Skilled workmen are good judges."

When the projects of the students in the experimental group were returned to them, they were each given a rating sheet and directed to read carefully the instructions, no further information being given. When the student completed the rating of the project, he returned it in order that his rating might be compared with that of the instructor. Then, in those cases where the scores of the student and instructor differed by two points or more, the attention of the student was called to the discrepancy.

All projects of the control group were likewise returned to the owners as soon as scored, but these were not rated by them. The total possible score obtainable and the student's score on that project were given to him at the time the project was returned.

Altogether four groups of projects were scored by the instructor and by the experimental group, in the matter above described. In order to avoid dealing with fractions, the scores of the scoring sheets were multiplied as follows, before making any statistical computations: Project 1 by 2; project 2 by 3; project 3 by 4; project 4 by 2. The total possible points in the following tables will not therefore add up to 100.

Do Instructors Agree on the Merit of Student's Work?

Two instructors agreed as to the ratings on the first three projects to the extent indicated by the following three correlations:[1]

TABLE I

Correlations between Instructor A and Instructor B on Three Projects Separate and Combined[2]

Project No. 1	.78
Project No. 2	.79
Project No. 3	.90
All three combined	.91

We may call these correlations, "scoring reliability coefficients." The above correlations indicate that instructors agree fairly well in their scoring of the same projects, but still not as well as desired. The above figures would lead us to expect an agreement of approximately .93 between two instructors in regard to the marks for the entire course if these are to be determined from the first four projects instead of the first three. This reliability of scoring, while not up to that of standardized academic tests, evidently is superior to that secured from scales for measuring the merit of compositions in English courses. Either by doubling the number of scoring subdivisions on the project, or by doubling the number of projects in the course, we could secure a scoring reliability of .95, which would be very satisfactory.

Comparison of Relative Improvements

Table II shows the average scores of the two groups.

TABLE II

Comparison of Average Scores of Experimental and Control Groups on Each of Four Projects and on Final Examination

Column	A	B	C	D
		Average Scores on the Project		
Project	Possible perfect score	Experimental, or judging,	Group Control or non-judging Group	Difference of Averages of Experimental Group Minus Control Group
1	30	15.8	17.7	—1.9[1]
2	21	11.4	12.2	—0.8[1]
3	28	16.1	13.9	2.2
4	36	24.4	20.6	3.8
Final Examination	100	75.8	62.2	13.6

[1]A minus score in this column indicates that the experimental group is inferior to the control group on the first two projects.

Table II shows the significant facts in regard to the increasing superiority of the experimental group over the control group. In column (a) are shown the possible or perfect scores on each project. In column (b) are given the average scores made on the several projects by the experimental group; these are contrasted in column (c) with the average scores made by the control group. In column (d) are shown the differences obtained by subtracting from the experimental group average score the corresponding average score of the control group. Column (d) is the most significant column of the table. Plus differences in this column indicate superiority of the experimental group; negative differences indicate superiority of control group. The results show that from an initial inferiority of 1.9 points, the experimental or self-judging group gradually improved over the control group until, upon completion of project 4, it made an average score on project 4 of 3.8 points higher than the control group.[3]

It is problematical what would have happened if the experiment had been continued further. We may guess that the relative superiority of the experimental group would continually become greater. The difference on the final examination is truly large, for the experimental group made a 13.6 per cent higher score on the written examination questions than the control group. The questions were composition questions. The same precautions as to concealment of identity of the writer of a given paper and the group to which he belonged, as carried out in the scoring projects, was maintained in the scoring of the final examination.

Was the Self-Rating Effective?

It is difficult to be certain whether the greater improvement in the case of the experimental group is due to the self-rating or to other factors which were not, or

[1]One instructor was unable to devote the time necessary for scoring the fourth project.

[2]The correlation coefficient is a method of quantitively determining how well one series of numbers parallel in all respects a second series. Thus if every student rated himself identically with the instructor, the correlation would be 1.00. If there was total lack of agreement, the correlation would be 0.00. Correlations of .80 to .90 are much higher than the relationship which customarily prevails between the first and second semesters' grades in most college subjects, since these are generally in the neighborhood of .60 to .70.

[3]The statistical significance of these differences may be inferred from the ratio of the differences to the probable error of the differences. When this ratio is as high as 3.0, we may expect the sign of the difference (whether + or —) to be maintained as at present upon a large number of repetitions of the experiment, roughly 49 times out of 50; or, as stated in a different way, when the ratios are about 3.0, we would expect the now inferior group to become the superior one in only one case out of 50 repetitions of the experiment. These ratios for the several projects are as follows: For project 1, 1.5; for No. 2, 1.0; for No. 3, 1.9; for No. 4, 2.9; for the final examination, 7.7. We are thus reasonably certain of the initial inferiority of the experimental group; and very certain of their superiority on the final examination.

could not, be controlled. For example, the rating sheets have a certain definite instructional value in the case of those who heed the cautions contained therein.

If self-rating is effective, we should presumably expect to find the following results:

1. Self-rating should lead to progressively better agreement (correlations) between the students' judgments and that of the instructor.

2. Self-rating should lead to greater consistency of quality of work from project to project. Do self-rating students settle down to a consistent, steady quality of their work? If so, this should be reflected in a higher average intercorrelation of all projects in the experimental group than in the control group.

3. The correlations or agreements between any two successive projects in the experimental group should progressively and consistently be higher than in the corresponding case of the control group. That is, there should be a higher agreement between the quality of projects 3 and 4, than of 2 and 3; and 2 and 3 should in turn show higher agreement than 1 and 2.

4. The self-correlation of projects, i. e., the agreement between the first and second scoring of the same project, when the experimental group rescores its projects after a short interval, should be progressively higher as successive projects are rescored.

1. *Correlation of students' scores with instructor's.*

TABLE III

Correlation of Students' Judgment with Scorer's Judgments

Project	Correlation Coefficient
No. 1	.54
No. 2	.32
No. 3	.56
No. 4	.23
All four projects combined	.82

The expected progressively higher correlations do not appear. Such appearance would probably depend on whether the projects progressively increase in order of difficulty, whether changes in difficulty are gradual or abrupt, whether enough scoring points are available on each project to give a wide dispersion of scores, whether the instructor has better judgment than the average student, so that improvement in their judgments would be reflected in higher correlation with his judgments.

Although the student and instructor do not agree so well as might be hoped on each project individually, they agree remarkably well on the total score of the four projects combined. This is an illustration of the common principle of compensation of early overjudgment by later underjudgment, and vice versa. If a student's term grade be his score on all four projects, then the student will agree with the instructor as to his term grade to the extent represented by a correlation coefficient of .82. Two instructors agree on the total of three projects to the extent of .91 and to an estimated extent of .93 on four. We may estimate that if the students had as many as eleven projects to score, their self-given term marks would correlate as highly as .93 with the mark determined by the instructor; i. e., as highly as one instructor now agrees with another when only four projects are involved. If the course were made slightly less than three times as long as the present length, the estimate is that the students would then agree with the instructor as well as two instructors now agree in regard to the marks for the present course of four projects. The same reliability of student judgment could presumably be secured by having each student grade the same project of three or four fellow-students, chosen at random, before scoring his own, the average rating of all student-scorers determining the final student-grade of a given project belonging to any one student. If such scoring would greatly improve the student-scorer's judging ability, it would be pedagogically very desirable. Improvement of self-judgment, including "appreciation," we consider to be an aim in vocational education worthy of any pedagogical effort necessary to attain it.

Of the 21 students in the experimental group, two tended rather consistently to underestimate the quality of their work, while six consistently overestimated their work. Such disagreements should be appreciably reduced in number if a larger number of projects were used. This, it will be remembered, is the aim of the instructor in calling attention to the discrepancies between instructors' and students' judgments. If this fails to bring about improvement, diagnostic performance tests, preferably self-administered and taken on the student's own initiative, should be given to discover why the student is failing to agree with his classmates and with the instructor.[4] If he disagrees with both classmates and instructor, his desire for improvement should be much greater than when resulting from the imposed authority of the instructor; this should logically lead to an inquiry, "Why am I failing to agree; what can I do to improve?"

2. *The Consistency of Quality of Work.*

It was assumed that self-rating should lead to greater consistency of good or poor work in the experimental group than in the control group, as reflected in higher average intercorrelations of the projects in the case of the experimental group than in the control group. The data are shown in Table IV.

TABLE IV

Intercorrelations of All Projects in the Two Groups

Projects	Correlations in the Experimental Group	Correlations in the Control Group
No. 1 with No. 2	.49	.43
No. 1 with No. 3	.40	.04
No. 1 with No. 4	.07	.38
No. 2 with No. 3	.78	.26
No. 2 with No. 4	.29	.52
No. 3 with No. 4	.54	.12
Average of 6 Correlations	.43	.29

From this table it is seen that in four cases out of six, the experimental group has a higher correlation coefficient than the corresponding one of the control group, as well as having decidedly higher average inter-

[4] For the bearing which inability to use measuring tools and inability to read blue prints may have on constructional ability, see: Ward, Cecil M., and Toops, Herbert A.—A Performance Test of Ability in Using Measuring Tools, Industrial Education Magazine, Vol. 27, No. 6, December, 1925, pp. 177-180. And also, Castle, D. W., Vocational Education Magazine, May, 1924, pp. 756-8.

correlation coefficients. The experimental group is thus more consistent than the control group on the quality of its projects.

3. *The Relationship of Scores on Successive Projects.*

If self-rating has any merits, the correlations between any two successive problems should progressively and consistently be higher in the case of the experimental group than in the corresponding case of the control group. The data are shown in Table V.

TABLE V
Intercorrelations of Successive Projects in the Two Groups

Project	Experimental Group Correlations	Control Group Correlations
1 and 2	.49	.49
2 and 3	.78	.26
3 and 4	.54	.12

This test of self-rating is decidedly in favor of higher correlations in the case of the experimental group. This test, even more markedly than the previous one, attests to the steadying influence on quality of work brought about by self-judgment.

4. *Self-Correlation of Projects.*

We did not test out the assumption that rescoring of projects would lead to progressively higher self-reliability coefficients; that is, higher agreement with one's self upon scoring the same projects a second time. Tests of rescoring by the instructor reveal that even the instructor cannot in all cases duplicate his previous marking of a project if his previous rating is not available to influence his judgment.

What Can We Conclude from the Experiment?

The experiment does not prove anything conclusively. A great deal more work with larger numbers of students is necessary before final results are obtained. However, some very significant hints for further work are suggested by the results. First, self-rating does seem to have a beneficial effect on the ratings of a student. How much of this is due to the recognition of the fact that his failure to obtain a better score is due to inaccurate measurements, poor construction, etc., and how much to definite instruction in the cautions given on the rating forms, at present cannot be conclusively answered.

Another implication is that students do know how to evaluate their own projects when given such rating sheets and further that the consensus judgment of four or five students is as reliable as that of an expert. Referring to Table III, the correlation between four projects judged by students and the same four projects judged by the scorer is .82. This is a very significant correlation, indicating a high degree of agreement.

Again assuming that the projects follow one another in proper sequence, and that they do not vary too greatly in degree of difficulty between any two projects, students apparently will consistently and progressively improve the character of their work, will show better agreement with the instructor's judgments as to the scoring value of their projects. They will further show greater relative improvement over students who do not rate their own work. These leads or implications are not conclusive, but there is strong evidence that significant and desirable results can be obtained by having the student systematically rate his own projects.

It must be borne in mind that in attempting a procedure of this kind the variables must be adequately controlled, and the technique for administering the ratings must be very definitely worked out beforehand. Each student must be provided with a standard rating sheet by which to rate his work. The projects should be measured by both the instructor and student as soon after the completion of the project as it is practicable to do so. The latter is particularly important—the student likes to know his score immediately, and, in addition, if he is going to profit on the next project by reason of eliminating some of the mistakes made on the previous project, he must know those mistakes before the following project is well under construction. Otherwise he will unconsciously repeat the same mistakes.

We have found that there is an inverse relationship between quality of work and total errors in judgment, the correlation coefficient being —.38. Those students who make the best products, as judged by the instructor's careful rating in general, make least errors of judgment as to quality of their work, and vice versa. With a relationship of —.38, it is apparent that there are a few notable exceptions of *good students* doing *poor judging* and *poor students* doing *good judging*. Two excellent students did very poor judging and four poor students did very good judging, or, in other words, these four poor students agreed *very well* with the instructor.

The students as a whole overestimated the quality of their work. With reference to overestimating the quality of work by students, we make the following comments:

1. The instructor should strive to reduce the number of errors of judgment in quality of good work on the part of students. In the small number of projects used in this experiment, it is noted that simply calling the student's attention to discrepancies between his ratings and those of the instructors, has not resulted in the elimination of a bad personal bias on the part of the six students whose ratings consistently disagreed with the ratings of the instructor. Of course, it is barely possible the discrepancies might have been much larger if the students had not had the matter called to their attention.

Carefully controlled experiments to study the course and rate of improvement in self-judgment is needed.

2. A constant error or bias, either of under-estimation or over-estimation, is far preferable to erraticity of judgment. With the former, the relative merits of a series of products may be readily determined and the products placed in their proper order as to relative merit. The latter, by no stretch of imagination, is of value and should by all means be improved, if at all possible.

If we were to make the proper statistical allowances for the constant tendencies of the six students who err most in over-estimation or under-estimation of the quality of their work, we may well believe that the true correlation of the ability to judge the quality of work and the ability to do, as measured by quality of work done, is as high as .6.

A good experiment to be conducted is that of having, say, 50 boys rate all 50 pieces of 50 boys' work on a given project, repeating the problem on different projects and by different methods of judging—over all judgments or total judgments, rating scale judgments, etc. The efficiency of different methods of rating might then be determined.

As previously stated, it was found that a few students tend to consistently overestimate or underestimate the scoring value of their projects. The educational implication of this is that certain individuals who tend to over evaluate their work need their attention drawn to the fact that they are weak in mechanical ability, or ability to judge or very likely both, and that those who consistently underestimate their product need to be instilled with confidence in the real quality of their product. Judgment of fellow-student's projects would reenforce the instructor's encouragement.

In the case of those students who are unable, after some practice, to judge well, it would seem very desirable to have self-administered diagnostic tests, which will reveal to the student the sources of his difficulties in judging: Can he, for instance, read a blue print accurately; measure accurately the dimensions of a project which has already been constructed; can he use ordinary measuring tools accurately? Does he have adequate command of applied geometry, involving such things as the ability to lay out with the dividers the three center lines of a six-arm pulley, to bisect a line or an angle, erect a perpendicular to a given line at a designated point, or lay out an angle of fifteen degrees with the dividers?

OCCUPATIONS OF GRADUATES OF TRADE COURSES

Frank R. Robinson, Head of Industrial Department, Central High School, Philadelphia

The administrators of an industrial course or any specialized course of study should be prepared to justify the existence of that course if they expect to have and to hold the confidence of the public who pays the bills. They should be prepared to give an affirmative answer to the question, "Are the boys who go through the training offered really entering the lines of work for which the course aims to fit them?" Unless this answer can be given, and backed up by statistical records, the course is really not functioning in the field for which it is organized. It has no justification for existing as it is, merely on claims made of its general usefulness. Schools like other lines of endeavor should justify their existence on the basis of their major activity and not on the basis of their by-product.

A study recently made by the vocational guidance committee of the Central High School of Philadelphia brought out the facts contained in the accompanying table.

The study shows that 83 per cent of the graduates of the industrial department are following the trades for which they prepared, are in closely allied trades, or are continuing their education in engineering colleges. The figures show that the industrial department is functioning as such, at least for those boys who graduate.

The course is carried on over four years. The last year is cooperative part-time education on two week shifts. The administrators of the department feel that the cooperative year has much to do with the high percentage of boys following their chosen trades. It is felt that the guidance given during the transition period between school and life work not only helps to place boys definitely in the trade of their choice but it also contributes to their more rapid advancement by bringing the employers' interest to bear on the boys and their work.

Employment of Graduates of the Industrial Department, Central High School, Philadelphia, 1923-24-25

	Elec. Const.	Mach. Const.	Wood-work	Arch. Dwg.	Mech. Dwg.	Total
A. Working at the trade studied in school,..	62%	50%	43%	70%	60%	62%
B. Working at related employment	10%	25%	29%	6%	16%	11%
C. Attending (day) engineering college	9%	25%	14%	18%	8%	10%
Total of A-B-C.....	81%	100%	86%	94%	84%	83%
D. Working at unrelated employment	12%		14%		8%	10%
E. Attending (day) non-engineering college.	7%			6%	8%	7%
Total of D-E.....	19%		14%	6%	16%	17%

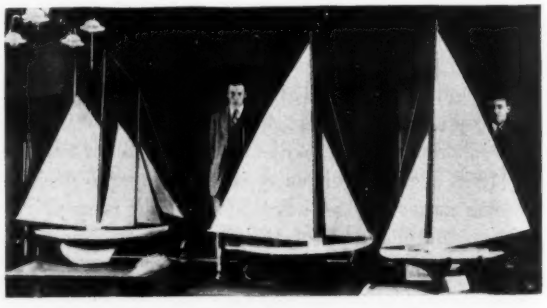
SOME PERTINENT QUESTIONS

Presented by Charles A. Wardner to the Apprentice Class, Part Time School, Jackson, Michigan

1. Are you a "self-starter," or does the boss have to get out and crank you up now and then?
2. Do you watch the clock, or are you so interested in your work that time seems to fly?

A list of questions to stimulate thought:

3. Do you always wait to be told, or do you use your thinker and see what to do?
4. Do you take pride in your work and each day try to do a little better than you did the day before?
5. Do you pay attention to details and try to remember what you have been told?
6. Do you make a list of questions that come up during the day in the shop and find the answers at school?
7. Do you try to make practical use in the shop of what you learn during the school hours?
8. Do you waste time lamenting that the production worker is making more money than you are, or do you think of the future when your rate will be higher than his?
9. Do you realize that you are being paid to learn a valuable trade and that this training is worth more to you than it is to the company you are now working for?
10. Do you try to show the company that you appreciate this by always being on time, doing your work thoroughly, quickly, and by being absolutely reliable at all times?



BOAT BUILDING EXHIBIT AT THE HIGH SCHOOL, FAIRHAVEN, MASS. MR. JAMES PARKINSON, INSTRUCTOR.

Vocational Guidance of the Misfit in Industry[1]

R. F. Carey, South Philadelphia, Pa.

THE functions of the educational department of a large corporation are at least twofold. First, to develop the best artisans, engineers, salesmen, service men, etc., possible, including the recruiting of the raw material; and second, not to try to make a good artisan, engineer, salesman or service man out of material suitable for a first class lounge-lizard. It is this second function that we are to discuss.

An educational department is not a charitable institution, nor is it conceived in the spirit of philanthropy; yet there is a service to be rendered to those under its supervision that smacks strongly of both. This introduces, logically, the subject of vocational guidance, which we will consider, more in detail, later.

An education department is a production department just as much as any other production department, but with one exception. Its major line of product is men, skilled men, men of intelligence, men with ability, ingenuity, stamina, tact, resourcefulness, and integrity. These qualities must be largely inherent in the raw material, but still may be encouraged and developed through careful supervision. If lacking in the raw material, the fault will quickly show up in the training process and raise the question as to the proper disposal of the delinquent. This necessitates an investigation into the cause of the delinquency and in most cases a frank heart-to-heart talk will convince the offender of the error of his ways. Most of us have a pretty clear conception of right and wrong, but sometimes there exists a warped impression of how much wrong we can get away with and a sudden jerking up will awaken us to the fact that we have gotten to the end of the rope. These cases are easily handled if gone after vigorously. We sometimes find that impending failure may be caused by home conditions or other causes beyond the control of the man. These again are usually correctable through a mutual understanding with both parents and student.

The Lack of Aim and Understanding

Then there are those cases that seem hopeless, or are hopeless. Taking the apparently hopeless cases first: These are often caused by a state of mind. One sometimes fails to appreciate that, in order to be successful, it is essential to do something that the world wants done. We have our dreams and our hobbies, but where these are outside of the wants of man, we can expect but little return on our efforts. We may be loath to be convinced that our particular pet is not accepted by the world at large, but when this realization is driven home there is little kicking. This plight is one faced by numerous inventors, who later become sadder but wiser and more useful members of society.

It is surprising how many of our technical students graduate with no definite aim or even faint appreciation of the various fields open to them. No wonder that a man becomes a misfit if he knows not of the field in which his inherent qualifications could be applied to best advantage. This condition applies just as forcibly to the graduates of schools of business as to schools of engineering, perhaps a little more so. Also, if our college graduates find themselves adrift, how much more should we expect to find our graduates of grammar and high schools still more at sea?

Vocational guidance is a wonderful thing when properly applied, but I sometimes wonder how often we miss and don't know it and how much our conceit is puffed up over the hits we may make entirely through accident.

Those who have contributed to the study of vocational guidance, have done much to aid in the proper placement of individuals in the industrial field. There is still a long, long road to be traveled. Some day when we have studied and experimented with, added to and cast aside, as we have done with mathematics, physics, and chemistry, then vocational guidance may become as exact a science as any of the three just mentioned. Until that happy day comes we can merely do our best.

Look through the list of alumni of any of our well known technical schools and you will find that 25 years after graduation, more than half labor in other fields than engineering and as determined by the National Industrial Conference Board, in the case of one well known school, twenty per cent of these are in fields entirely disassociated from engineering. What a saving to society, if each of these could have been definitely trained for the job he ultimately filled!

Naturally in a long experience there have been many cases of misfitting come under our observation. Most of them were treated as outlined above. In some cases we made a hit, in some we didn't.

One case I recall, of a boy on our machinist apprentice course, who did not care for study although he passed, easily, the simple examination in arithmetic given at the time of application. He lost out, however, due to a gruffness in his nature that kept him constantly in hot water, so that we had to let him go. We were unable, in his case, to place him where he belonged. The answer, however, was obvious enough. He found it himself. He is doing nicely as a railroad brakeman.

Helping Men Find Themselves

A foundry apprentice showed a marvelous propensity for doing less work than any of the other boys, with perfectly overcoming reasons why. After succumbing to his bland manners for sometime we let him go. He, too, found his proper niche. He's delivering ice.

[1]A paper read before the Industrial Conference of Pennsylvania State College May 15, 1926. The author is Supervisor of Education for the Westinghouse Electric and Mfg. Co., South Philadelphia Plant.

A graduate of a large eastern university had majored in mathematics and physics. He applied as a graduate student and, as at that time we were interested in developing some foundry executives, I "sold" him the foundry. In time he became attracted to sales work and dissatisfied with the foundry, so I transferred him to one of our sales courses. This in time took him to East Pittsburgh, where he came in close contact with a group of students heading for the electrical engineering departments. This appealed to him even more strongly than did sales and he consequently was transferred to the engineering course. He has made quite a reputation since, in the design of electrical machinery. This is a clear case of a misfit getting straightened out through a broadening vision; a realization of what other previously unknown fields had to offer.

Whether a man is a misfit or merely undecided, if there can be placed before him a means of appreciating the various fields available, with an opportunity of obtaining experience in each, then the problem is well nigh solved, as the man will find himself. This is illustrated by the case just mentioned. As a further illustration I might cite any number of instances where men have changed from an objective of engineering to sales, from service to sales, or from service to engineering, solely due to the influence of a broadening vision.

We had a peculiar case of a machinist apprentice who had an evident love of mathematics, but had little mechanical instinct. He reminded me of a bank cashier some years ago, who thought that the spokes in the wheels of his bicycle were put there for ornament only. We advised this boy's parents, as we always do in such cases, that Harry was not in the proper field and advised him to withdraw, suggesting accounting as a more suitable vocation. They followed this suggestion and Harry is now doing very well as a bookkeeper.

Personality, Health and Parents

Personality is frequently an index of considerable value. Theodore was a machinist apprentice, with the best of southern blue blood running through his veins. He had a most pleasing personality, such as you might expect of a son of a Kentucky colonel. He had quite an inclination toward the mechanical, but he surely did hate work. We bore with him for some time, took the matter up with his parents and now, on our suggestion, he is doing exceedingly well selling automobiles to the breeders of Kentucky thoroughbreds.

Health, too, plays an important part in the determination of one's chosen field. Tom, again a machinist apprentice, was a mighty likely chap, intelligent, quick, mechanical in his tendencies, had a fine personality, but could not stand the confinement of the shop. We gave him all we could in the time that he was with us and on leaving suggested the obvious thing, outdoor employment, in the field of civil engineering. He has played an important role in the construction of the Delaware River Bridge, in which he has attracted considerable attention.

Parental influence also has to be reckoned with. Doting parents often want Willie to be something Willie won't or can't be. Most parents don't want their sons to follow in their footsteps, especially if they earn their meat by the sweat of their brow. They fail to realize that over ninety per cent of our people earn their livelihood by manual labor. As a result much time is lost by forcing Willie into some distasteful, unsuitable pursuit, only to have him rebel later, such as in my own case. Mother wanted me to be a lawyer and so encouraged me in my academic studies. Father wanted me to be an engineer so he bought a horseless-wagon back in 1902. Father won, but I have gone into educational work by my own volition.

I have in mind a case of one of our toolmakers and his son. The father served his time as a molder. He liked the work, but found it too heavy and slowly drifted into the tool-room, where he has developed much skill with the drill press. He wanted his boy to be a machinist and we started him off as such. After doing our utmost we finally came to the conclusion that it was a waste of time and effort. The boy was big, robust, and willing, but he lacked the mechanical instinct. We felt that he had some of the qualifications for foundry work and transferred him to it. He has finished his time and is doing well on the large, heavy work.

What's it all about, this helping the misfit?

Fundamentally it's vocational guidance, based on a keen desire to do the best thing for the boy; applied common sense, activated by a close study of the boy's inherent tendencies, to the end that society may obtain a more useful member.

FURNITURE MADE BY SENIOR STUDENTS OF MR. ALFRED S. MADSEN, MILWAUKEE STATE NORMAL SCHOOL.

Preservation and Classification of Reference Material

H. L. Weatherby, Director of Manual Arts, Montgomery, Ala.

IT takes years of teaching experience to bring one to the realization of the importance of some systematic means of saving and classifying the valuable information and data, that comes within the covers of magazines, bulletins, and advertising pamphlets, throughout the months and years of one's teaching life. To have this material instantly available and at one's command, simplifies the teaching, lightens the load, and enriches one's efforts beyond measure. It is well then, for everyone to adopt some system of caring for this vast store of teaching treasure, and with that in mind I have tried to illustrate what, to my mind is the most practical method of preserving the material that comes to hand, in its varied forms.

Of course it is taken for granted that all wide-awake men in the profession subscribe to one or more purely professional magazines. Then there are numerous periodicals, although not designed primarily for the teaching profession, yet allied in aim and purpose to that in which we are engaged. And that purpose is, if I may so express it, the teaching of better living through a more thorough knowledge of industry, and the vocations in industry; in some one of which most of our pupils must each at some time engage. There are any number of these technical magazines related to the trades and professions, some of which probably most of us receive.

With this wealth of material, over which the keenest minds in industry and "industrial pedagogy" have concerned themselves, coming to our desks at regular intervals, is it fair to ourselves to cast it aside after a casual inspection? Is it fair to our classes not to use better ideas and improved methods as developed by experts, simply because we cannot, when the time is ripe to use them, put our hands on such-and-such a magazine of such-and-such a date (as near as we can remember), that contains just exactly what we want? And so it goes in many school shops. If we do not care for this material methodically, as a part of the routine work, it is likely to become lost to us for all time, and in losing it we lose the best teaching material to be had at any price, not excepting technical reference books, which we all know we could not well do without. We, in our schools, count our shelves of carefully preserved magazines, special bulletins placed in our hands by manufacturers of the tools and materials which we use, tracings, blueprints, illustrations, and articles gleaned from here and there as all very much worth while, and we feel amply repaid for the labor involved in collecting and cataloging.

However, simply collecting this material and saving these magazines is not enough. To bring order out of chaos we must be able to put our hands at short notice on any particular article, illustration, or drawing; the measure of the efficiency of our system depends on the ability to do this. Being able then to do this, and having the material available, places in the hands of the teacher the finest pedagogical tools at his command, with which to carve the destinies of young America.

Now for the method of caring for the material. We receive in our school at least three monthly magazines, subscribed to by teachers of the manual arts de-

SEVERAL HELPS FOR FILING MAGAZINE AND OTHER REFERENCE MATERIAL.
1—The Card Index File. 2-3—Back and Front View of a Magazine File. 4—Files of the Industrial-Arts Magazine. 5—Loose Leaf Books. 6—Typical Pages of Loose Leaf Books. 7—A Handy Type of Scrap Book.

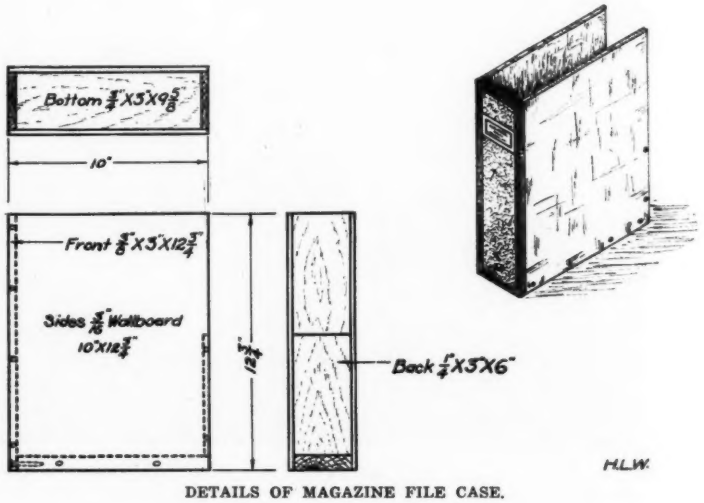
partment, that we would not consider mutilating under any circumstances, and we care for these throughout the years, in their original form, filing them by years. We find the old ones quite as valuable as the current issues and we index them from month to month, as they arrive, keeping a 3"x5" card system for them, indicating articles, under proper heads, the name of the magazine, date, etc. Keeping this card system up to date calls for no great amount of work. It is also the only way in which one can put his finger on any particular drawing or article at any time, and it is the only way in which one can get the full good from his magazines. The accompanying illustration (see Illustration 1) shows a simple 3"x5" card filing case. As these cards begin to accumulate in the file, and as one refers to them more and more frequently, he begins to realize what a vast store of information, drawings, and designs is at his command.

The making of magazine file cases is a very simple matter, and they, or some other good means for preserving the magazines and keeping them accessible, is a very necessary part of our system. The cases must be planned to fit the periodicals for which they are to be used. All materials should be cut exact, so that the boxes may be worked up in some numbers with the least possible fitting, thereby saving time and trouble. (Illustration and working drawing show materials and construction for cases to accommodate twelve issues of "The Industrial Arts Magazine.") The bottoms, fronts, and backs should be made of some soft, close grained wood that will not split easily. The sides should be cut to exact size from one of the numerous brands of wallboards, using a fine cutting circular saw. After nailing the front to the bottom, tack the sides in place using carpet tacks. Then tack the back into position, after which the case is ready for covering. Purchase from a printing supply house some marbled paper and a good grade of book cloth. Cut a piece of the paper large enough to cover the front of the case and with thin cabinet glue, rather than paste, glue in place. Glue a label strip in position near the top. Now cut the book cloth into one-inch strips, fold or crease down the middle of these strips, and bind all four front corners with these, gluing them into position.

So much for the preservation of magazines which we wish to keep intact. Now as to the miscellaneous material which appears in so many ways and from so many different sources. The materials can ordinarily be well classified as to the nature of content, and also as to convenient sizes, since most of the regular publications are fairly standardized as to dimensions. As a sample case, in caring for this material, we will consider some of the *builders' trade* magazines. A large part of these publications is filled with advertising which one does not care to keep. However, there will always be blueprints, house plans, details of construction, and other features that are well worth preserving by teachers of drawing and woodworking. These may be removed from the book and placed according to classification under loose-leaf note book covers (see illustrations). These covers may be purchased at the ten cent stores and we find them invaluable as a depository for material that probably would otherwise become lost. It is well to use gummed cloth rings to reenforce the paper at the punched holes. These gummed rings are also easily procurable from the "five and ten," or from the stationers', at a very small price. The filled note books will not look out of place on the shelves among regular books, and after a surprisingly short time spent in collecting, they will contain a splendid lot of reference material. They may be classified as to architecture, details, designs, working drawings, finishing, as to the nature of the material gathered together.

Next in order, and last but perhaps not least in importance, comes the scrap book. There is a certain fascination for most people in the keeping of a scrap book, and odds and ends are easily tucked away under its covers, where they also can be indexed, for future reference. Scrap books may be made from almost any kind of blank books, of fair size, by removing alternate pages to allow for filling in, or one can purchase the books with gummed pages, cheerfully awaiting their contents. Sheets from the advertising pages of magazines, of floor plan sketches; beautiful interiors in colors; illustrations of furniture; technical data of various sorts; are all excellent material for a scrap book. There is no end to the material available and it is a question of how little to use rather than how much.

This probably seems like a great deal of work, but it really takes very little time when planned and carried out systematically and it is simply a matter of keeping it up-to-date.



DETAILS OF MAGAZINE FILE CASE.

To summarize briefly:

First: Go through your choicest magazines each month, after reading them, say, at about the time of arrival of the following month's issues. Check over all articles for which you think you might have further use. Type the names of these on 3x5 cards under the proper headings, giving the name of the periodical and the date. Then file this magazine in its case under label of publication and year. File the cards in their places in the file.

Second: Go through your other trade magazines. Cull out the undesirable from point of preservation. Classify the loose pages as removed, under loose leaf notebook covers. This will probably include much technical material of an advertising nature also, but not any the less valuable for that. Some of our best technical data and reference material is put out by manufacturers of advertised products.

Third: From any and all sources clip the things that you want to keep. Home and women's magazines are always full of the stuff we wish we hadn't thrown away. Take these clippings and place them in a scrap book where they will be available for that time or those times that you wish you had that very thing.

Keeping up with magazines and their contents will prove advantageous, and we recommend it, particularly to all those engaged in teaching. It is well for the young teacher beginning his professional career, with little material available, to "latch on to everything that is loose" (as the saying goes), and to save it. We mustn't forget that our mental capacity is measured by what we have acquired from others, and the finest way in the world to keep on acquiring and growing is to keep up with our profession and its development through the current magazines.

Accident Prevention in School Shops

James K. Shallenberger, Brighton, Colo.

(Continued from June)

This paper deals with the hazards which, due to the construction of the room or arrangement of equipment, may exist in any shop. Before any effort is made to eliminate accidents in using tools, it is the duty of the instructor to scrutinize the shop for potential dangers which will be confronted by the boys in moving about the place.

These hazards should be eliminated where possible; most of them can be with a little thought and work; others due to the construction of the room, should be minimized by whatever device seems most efficient in warning the student to take care. Whatever form the warning takes it must be insistent and be automatic in its action. Verbal warnings to the class have only the value of explaining the source of danger, but must not be depended upon to guard against forgetfulness at the very moment the danger is imminent.

While no list can be complete because experience tells us what is dangerous, the following are of such frequent occurrence that some of them may be found in any shop. A careful survey will generally find others.

Dangers Inherent in Construction of the Shop

Stairways.

1. The open stairway without a guard railing is a hazard too obvious to need comment. It is very rare.

2. Sometimes improvised balconies, basements, or pits are built, leaving very restricted room for stairs. The result is steep pitch, and narrow treads. In this case, a ladder is preferable because it suggests using the hands as a caution against falling. A stairway invites going down in the usual way, yet narrow treads are frequently a source of accidents.

3. Where stairs are built with low overhead clearance, there is always the possibility of bumped heads and a throw forward or backward. Where the location of the stairs makes this low head-room unavoidable a caution to everyone going up or down to "duck" head may be arranged by hanging tell-tales like those in use by railroads to warn train crews of approaching bridges and tunnels. Above and below the flight hang strands of cord six inches apart for the width of the stairs. These should be just long enough to show the overhead clearance. These will brush the face of anyone too tall to pass through erect and will act as an ever present warning.

Balconies

1. The first consideration in balcony construction is strength. Inspect the supports. Are they designed to hold what they are carrying?

2. Is there a guard rail or any means of preventing a person from backing off while working there?

3. Is material piled so that it can fall off? Could a keg of nails or an old pulley roll off? These things should always be piled "flat."

4. If the headroom is restricted, tell-tales as described under "stairways" may be used.

5. If the headroom is restricted inspect all of ceiling for protruding nails, which might easily be fatal if a head were inadvertantly bumped.

Trap Doors

1. Inspect the support for the trap. Will it hold any machine, bench, or piece of work that is likely to be rolled over it?

2. If the trap is left open, a guard should be built to prevent anyone accidently stepping into it. If a guard is not placed over it, a boy should be detailed as a watchman while it is open. This is especially true if the trap is located near a door through which one may walk and unseeing, slip into the opening. One excel-

lent way to keep the railing handy is to suspend it from the ceiling so it may be let down with ease.

Lumber Pile

1. Inspect the lumber rack for protruding nails which may endanger a head or an arm of some investigating boy.

2. The location of the lumber pile should, when possible, be such that a boy swinging around with a long board cannot bump another one operating a machine. This is a very real hazard because both persons are too occupied with their own task to consider anyone else. If room is not available for safe clearance, a strict rule should be enforced that machines shut down while lumber is being loaded or unloaded from rack, or vice versa, depending on the importance of the work at hand.

3. Have make-shift racks been built overhead from which short pieces may fall or poorly stacked piles may tip?

Electric Wiring

1. Switches. All switch boxes should be grounded.

2. Switches with loose or missing handles should be repaired. A loose handle may snap and throw the hand across poles.

3. Inspect the insulation on the glue heater and all plugs. Short circuits through a glue heater are especially dangerous due to excellent contact made by wet hands and brush.

4. Any wiring exposed to rubbing by doors, lumber racks and the like, or any wiring which might be torn loose by a board being swung about at a machine, should be changed or put in conduit.

5. Any light sockets having faulty keys should be replaced.

6. Repairing. When wiring is being repaired signs should be placed on switches reading "DO NOT CLOSE! REPAIRS!" and as an added precaution fuses may be removed.

Line Shafts

It sometimes seems necessary to put line shafts on the floor, but more often than not the imagined necessity is really a desire to escape the more difficult task of hanging them overhead. They are always dangerous on the floor and should be guarded by rails or boxed in. Belting in such a location that students pass over or under it, with any possibility of contact, should be changed or guarded.

Motors

Motors mounted on floors should be so located that they offer the least chance of tripping. In the case of millers, jointers and saws, where frequently one boy backs away from the machine while pulling through a board, the pulley should be toward the inside so that the frame of the motor is not in the path of the operator. The belt, of course, should be housed.

Tool Racks

Racks for tools and clamps offer a potential hazard if the tools are crowded so that in removing one, others may be dislodged and fall. This is especially true in the south and southwest where "the barefoot boy" is still the prevailing type. It is a common practice to use nails upon which to hang saws, hammers, etc. Cornice hooks are cheap enough to justify their use in place of nails; both for the added safety to the person and to the tools themselves.

Missiles

The throwing of blocks, shavings, and saw dust is properly a matter of discipline, but it is a hazard nevertheless. The first day in the shop finds some boy who discovers the possibilities of saw dust or blocks as a means of annoying his neighbors. The danger to eyes could be made the basis of the prohibition with greater hope of success than a lecture on the ethical problems involved. However, the strictest prohibition of such conduct should be enforced.

Scorpions and Tarantulas

In the southwest these "varmints" are not infrequent visitors in the shop. The scrap box and the wood pile are their favorite haunts, and their protective coloration makes them easy to overlook. Their sting is not dangerous to a healthy boy of school age but it is extremely painful. First Aid treatment is a few drops of aromatic spirits of ammonia in a little water, taken internally.

Dangers of Shop Operations

Testing Power Inlets

Some people make a show of putting the fingers in a fuse plug or across a switch to determine whether the power is on. This is a foolhardy performance which should never be allowed in a shop. No one is immune from a dangerous shock from 110 volts if bodily conditions are right. Furthermore, a bad insulation or ground on the system may give considerably more than the 110 volts. The "finger test" shows no courage; it rather demonstrates utter ignorance of the structure of A. C. power circuits.

Pouring Babbitt

The process of babbitting bearings offers the danger of explosion. If grease or water is present the hot metal generates gasses too fast for exit through vents. As a precaution, the bearing should be heated with a blow torch long enough to burn away any grease. If damp clay is used as a dam, vents should be made with a needle at numerous points.

Moving Heavy Loads

The danger in moving loads is in the liability of mashed toes and rupture, together with mashed fingers in letting down the load. Before attempting to move a machine, or the like, the path must be made clear, as far as possible, of any obstructions over which one might trip. It is the sudden release of the hold by one, putting an extra strain on others, or a violent attempt at recovery, that causes a rupture or a mashed toe. Blocks should be in place at the end of the trip so that the load may be lowered with clearance for the fingers. If the trip is a long one, likely to require rest, a helper should

assist with boards to slip under when the load is lowered.

Bending Wood

Sometimes wood is bent with the aid of clamps in such a way that a slip of a clamp may release a dangerous rebound. Care should be observed in the position of the workman so he will not be in its path should this happen.

Dangers in the Use of Hand Tools

The accidents resulting from the use of hand tools are for the most part of a minor nature. The boy gets a bruised finger, or a cut, which is painful enough to render him *hors de combat* for the shop period, but otherwise a little iodine and a piece of gauze are generally sufficient to dismiss the affair. However, prevention of accidents is our duty, no matter how inconsequential the injury. A few tools and a few bench operations mentioned here offer chance for accidents rather more serious than most, and a discussion of them is presented. It is worth while here to repeat an earlier statement that the way to prevent injury in the use of tools is to call attention to the danger at the time the tool is to be used. A brief explanation of the danger, together with a little pantomime, is far more effective than any amount of warning. The boy thinks too much of his own skin to ignore danger if he recognizes any act as dangerous.

The Hand Saw

1. Torn finger nails. This sort of cut is frequent. It results from a too vigorous down stroke when starting a saw in hard wood while guiding the blade with the thumb. The saw is under compression and bows as the teeth stick on the arris of a board. The spring back, when it releases, rips open a thumb nail. It can be avoided almost entirely by teaching the boys to start a cut with the up stroke, as the saw is thus under tension instead of compression.

2. The back of the hand frequently gets an ugly cut while sawing tenons and ripping small pieces held upright in a vise. This occurs when the left hand is used to support the piece while the saw is used above it with the right hand. If the saw slips out of its kerf, or the stock splits, the left hand, like enough, stops the saw. The writer carries a scar caused in this way. This method of sawing is not workmanlike at a bench. If the board needs support it should be lowered in the vise. There are, however, times in floor work and building when it must be done, and the danger should be explained.

The Coping Saw

The chief danger with this tool is the snapping of the blade. If the boy fails to keep his face at a respectful distance while watching his lines an eye may be blinked out.

Chisel

The paring cut with a chisel is the most productive source of cuts of any bench operation in the shop. It is very convenient to hold the work on a bench hook with the left hand while pushing the chisel with the right. Any operation with a chisel which offers an incentive to hold work with one hand in front of the chisel is dangerous.

The Boring Tools

It is common practice to teach boys not to bore entirely through a board from one side, but to feel for the screw point coming through, then to reverse the board. The danger here is slight but when over eager boys try to push the bit through instead of boring through they are likely to get a torn finger for their energy.

The Adze and Broad Hatchet

The adze and broad hatchet are tools seldom used by boys. Both are dangerous. The adze will nick the toes and shins of any but the experienced unless he stands feet apart and swings the tool between them. The hatchet frequently fails to take a bite and swings down to cut a leg.

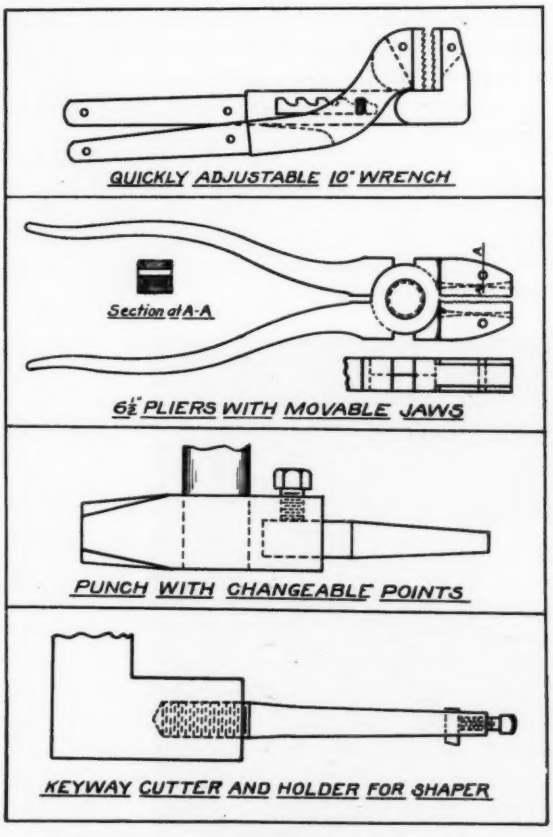
A SHOP CLASS OF CRIPPLED CHILDREN IN CHICAGO.

Forge and Machine Shop Projects that Meet New Demands

Claus S. Asp, Tulsa, Okla.

PRESENT demands and tendencies in industrial education are in the direction of the general shop and away from the shop with specialized courses. This change must be due to a recognition of the fact, discovered in recent research, that only a very few of the pupils in any given school are likely to enter any one of the specific trades or occupations which are now taught in schools; hence no school, especially one of smaller size, is justified in emphasizing specialized, industrial courses. Another potent reason is that the smaller school systems cannot hope to provide metal working shops of the old type because of the great cost involved. Therefore, the general shop has been devised to serve more fully the needs of pupils. Its purpose is to provide training along industrial lines so that the students may be able to understand, appreciate, and more intelligently use the conveniences and benefits which are the result of our advanced industrial development.

To make the work in a combination shop, with limited equipment, a success, a new type of shop projects needs to be developed. It is the purpose of this article to describe some such projects which have proven successful in the shop course of the Mountain Iron high school. However, let me add that I consider the success in the work in no small measure due to the enthusiastic encouragement and support given by the members of the school board, several of whom are themselves practical mechanics.


QUICKLY ADJUSTABLE 10" WRENCH
Section at A-A
6½" PLIERS WITH MOVABLE JAWS
PUNCH WITH CHANGEABLE POINTS
KEYWAY CUTTER AND HOLDER FOR SHAPER

DETAILS OF A WRENCH, PLIERS, PUNCH, AND KEYWAY CUTTER.

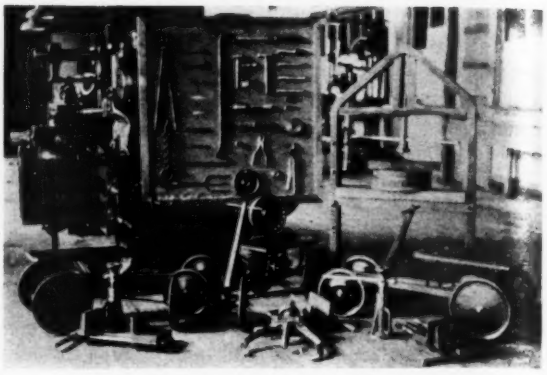


EXHIBIT AT TULSA, OKLA.

Until three years ago the shop work consisted of the traditional woodwork and mechanical drawing together with some auto-mechanics and electricity. Then to meet the urgent demand for a greater variety of practical work, the old gymnasium which had been used as a lunchroom for several years, was reconditioned and made into a spacious shop. There, four double forges, two lathes, a milling machine, a shaper, a drill press, a power saw, and a grinder were installed. There was still room for the auto mechanics equipment. In that room and with that equipment it was the author's duty and privilege to work out a suitable course of instruction.

The main objection that one hears against the small shop with limited equipment is that only small classes can be accommodated, hence the cost of instruction will be high. To overcome this objection such projects were selected as would combine the forge and machine shop work, proportion the work among the different machines, and give the proper amount of bench and vise work. This, the author maintains, was accomplished without sacrificing any of the fundamental operations; and not only that, but the projects, being of the usable type, created an incentive and enthusiasm in the work that could not very well have been aroused by any other means.

In one of the accompanying illustrations herewith are samples of some of the most important projects. This picture shows also the main part of the shop.

Of all the projects made, the "Irish Mail" cart proved to be most popular with the boys. This project also proved very satisfactory from the teaching standpoint, in that it provided for a great variety of practical machine operations. The cart shown was made 18" wide, 42" long, with 12" wheels. The front wheels, which have roller bearings, were bought ready-made, while the back wheels were made in the shop. For this

purpose the arbor press shown was made to press the discs into shape. This machine is suited for auto-mechanics work. The hubs for the wheels were made on the lathe, from one inch iron. A ½" hole was drilled, and the shoulders for the discs formed. After the keyway had been made, and the discs were riveted on, the wheels were placed on a shaft, revolved, and trued up. They were then clamped together firmly, and the holes for the rivets at the periphery were drilled, after which the discs were riveted together. The axles were made of cold rolled steel. In the rear axle were milled three keyways, to hold the wheels and the small gear firmly in place. The cutting of the keyways in the gear and hubs was accomplished by making an L-shaped tool holder for the shaper. This is shown in the drawing.

The rear axle was fastened to the frame by iron straps, inside of which were discarded automobile brass bushings, in which it was free to revolve. The large gear was also provided with a brass bushing hub to increase the width of the wearing surface and to prevent rapid wear. The axle and the shaft that holds the large gear were fastened together by an iron strap that prevents the gears from being forced apart by great stress. The large gear is made of cast iron and has 58 cogs, while the small one is made of machinery steel and has sixteen cogs. Small holes, in which were placed cotter keys and pins, were drilled through the keys and shaft to hold the wheels and gear in place, and to prevent them from working loose. Some cars were made with a different gear ratio than the one given above, but in a race between the boys to determine the most practical gear ratio, this one proved most popular.

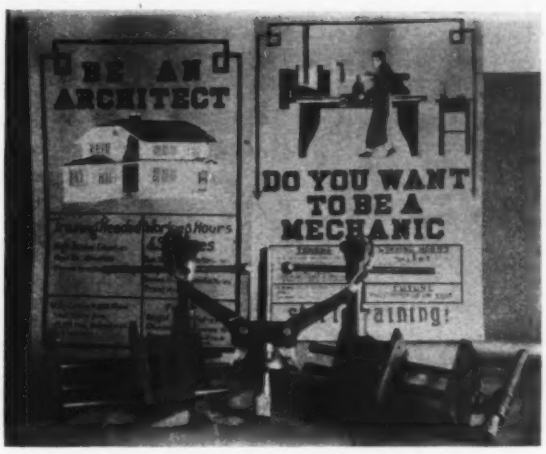
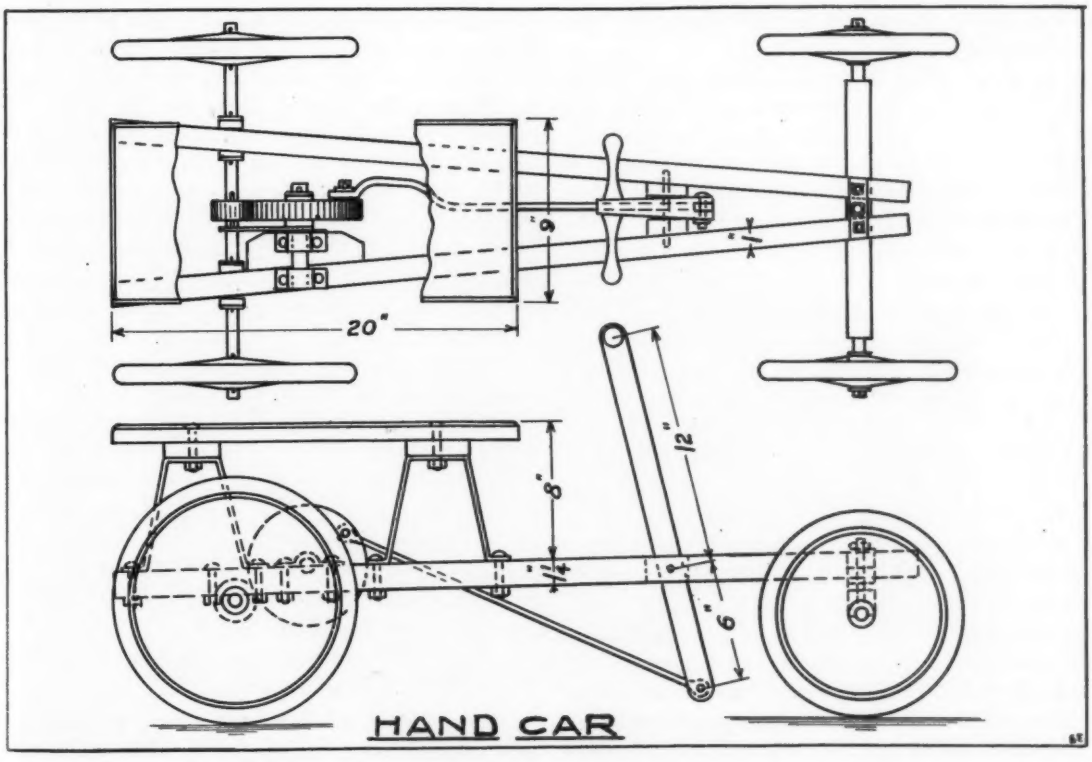


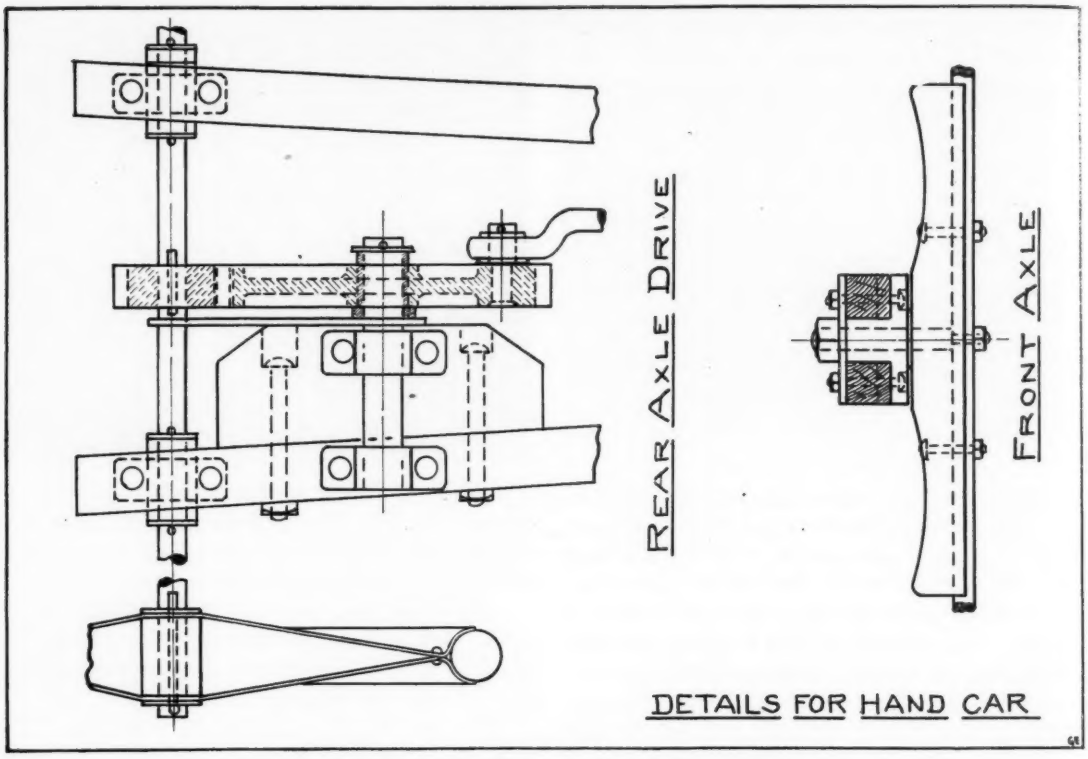
EXHIBIT AT TULSA, OKLA.

The straps that hold the brass bushings for the rear axle and the shaft for the large gear, braces for the seat, and the rod that connects the hand lever with the gear form practical forge projects.

The vises shown in the picture were made to replace the old vises in the woodworking shop, which were nearly worn out and of a poor design. The new ones are rapid acting screw vises. The patterns for them were made in the school shop, and the castings were made in a near-by commercial foundry. The making



DETAILS OF HAND CAR.



DETAILS, REAR AXLE, FRONT AXLE, AND REAR WHEEL OF HAND CAR.

of the vises provided practical work on the lathes in the form of cylindrical turning and thread cutting. But the project was primarily planned in order to offer suitable beginner's work on the shaper and drill press, which machines usually remain idle in many school shops for lack of suitable projects.

One of the school busses needed new brake lining, and a hub puller had to be borrowed to remove the hub from the axle shaft. To buy such a hub puller would have cost $40, so it was decided to make the one shown in the picture. The central portion was made from a part of a dipper tooth, while the arms were forged. All the work on this interesting and valuable project was done by the boys, although the course at that time covered only one year.

The pliers and wrench shown on the display panel and in the drawings were designed to meet the demands for more advanced work, in which care must be exercised and skill developed. At the same time incentive and interest are created by producing useful and practical tools.

The special feature of the pliers is that the jaws are free to turn on a pivot pin, which enables one to secure a parallel grip longitudinally on any object, regardless of its size or shape. The round central portion of the pliers was drilled by a drill that had been ground flat at the end, except for the point that was left to act as a pilot for the bit. The jaws were milled on the milling machine, and the face knurled and a small groove cut on the shaper. The general construction of the pliers is shown in the drawing.

A wrench like the one illustrated enables a mechanic to secure a firm grip on any sized nut, pipe, or iron rod. It is quickly adjustable by moving the handle with the inner jaw, which is provided with a rectangular rivet pin, along the slit in the other part to any of the stops or shoulders. This is done by turning the two parts at such an angle to each other that the pin in part 1 will be turned sidewise along the slit in the part marked 2 in the drawing. The advantages claimed for this kind of wrench are that it has few parts, and the worker does not need to go through any false motions when adjusting to size. The jaws of the wrench were made of the same part as the handles, but in later designs they have been made of separate parts so that the teeth can be milled more easily. (The teeth in both can be cut at the same time by turning one of them end for end.) The new construction also makes it easier to temper the jaws and to replace them when worn out. Wrenches of later design, as is shown in the drawing, are provided with handles of wood or fibre composition to make them lighter and more agreeable to handle.

The blacksmith's punch, which features changeable points, was designed for the same purpose as noted above. It is very practicable for it saves labor and material in making a supply of punches of different sizes and shapes for a forge shop.

The wrench and punch were invented by a former student of the high school.

In the Mountain Iron high school, woodwork and mechanical drawing is given in the ninth grade, while nineteen weeks of auto mechanics and electricity and

another nineteen weeks of forging and machine shop are given to the sophomore boys. Last year the first attempt was made to incorporate a study of vocations with the shop course for the sophomore boys. This was done to supplement the shop work and to create vocational intelligence. The two display charts in one of the pictures have been selected to show the summary form of the study of occupations. Each boy is allowed to make his own selection as to trade or vocation to study, and to report on, and to summarize his findings and conclusions in a similar form to those shown. The time devoted to this study may perhaps be of as great benefit to the boys as the time spent in the study and making of other shop projects.

What Should the Trade Teacher Know?

George C. Faville, Jr., Hampton Institute, Virginia

Propound that question to the next ten teachers you meet and see how many answer, "The trade, of course!"

There can be no quarrel with the thesis that a trade teacher should know his trade. The error lies in the implication that he need know little else. A rather surprising number of persons who should know better appear to believe exactly that. It seems customary to view the trade teacher as a tradesman rather than as a teacher. The adjective is stressed to the detriment of the noun.

It is well to pause occasionally and check up on fundamentals, even at the risk of being thought queer. Is the trade teacher's most important asset a knowledge of the trade? Consider the question seriously a moment and then you may have as hearty a laugh as you wish.

What is the trade teacher supposed to do? Teach a trade. What, then, should he know? How to teach a trade. That seems to be a perfectly proper conclusion, yet how different a facet of the question is thus presented!

But, you may object, he cannot teach the trade unless he knows it. Unfortunately, he cannot always teach it when he knows it well.

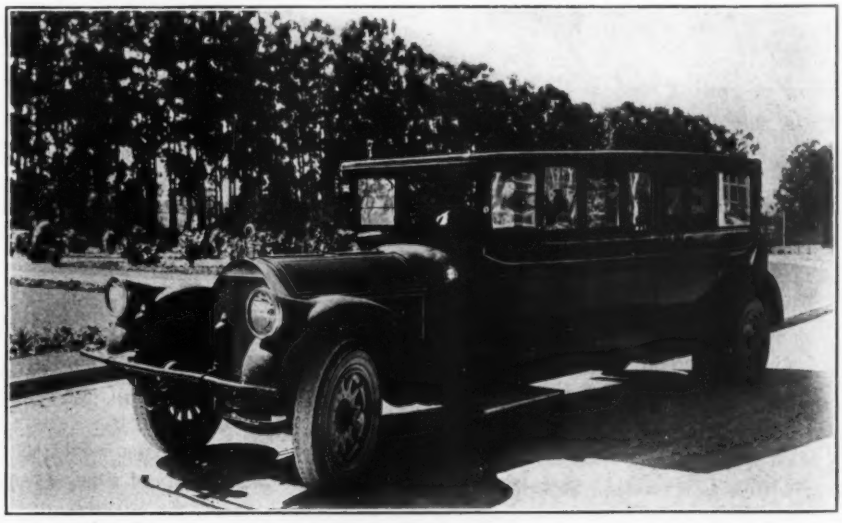
This Socratic method of chasing the truth might be profitably followed in another direction. What *is* the trade teacher's trade? Forging? Foundry work? Printing? Carpentry? Not at all. The trade teacher's trade is teaching.

Trade teaching, objects the gallery, is a specialty. Let us examine that briefly. Certain pinnacles and spires are reared above the sky line of a modern city to catch the clearer air and brighter sun. Yet, each is supported in its altitude by the good, broad foundations going down to a common hardpan. So with your specialties. Each catches the light from a different angle, but all are founded on common fundamentals.

The truth is that the trade teacher is no more a specialist than is the teacher of English or history. He must know how to teach a trade. They must know how to teach history, or how to teach English. But all must, first of all, know how to teach.

We may get further if we divide our sentence. We agreed, did we not, that a trade teacher must know how to teach a trade? Let us say that a trade teacher must know (1) how to teach (2) a trade.

There are two fundamentals and I think they are listed in the order of their importance. Knowledge of teaching and knowledge of the trade are to the trade teacher what the trained mind and skilled hand are to the artisan. Both are necessary to a good job. Yet there can be no doubt which is the greater.



ONE OF THE SCHOOL BUSSES BUILT BY STUDENTS OF THE SAN MATEO UNION HIGH SCHOOL, SAN MATEO AND BURLINGAME, CALIF.

All the mechanical parts were made in the Auto and the Machine Shops; the body and top were made in the Wood Shop; and the painting was done in the Industrial Department.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

WHAT NEXT?

After a long program of advice and congratulation the line of graduates file passively by and receive the emblem of four years of school work done passably well.

This is the "commencement" to which fond parents and friends and pupils and teachers have looked forward as the completion of a great ambition.

The teacher who has labored and hoped and sometimes feared for the success of each young graduate in the class reviews them with mixed feelings of confidence and premonition. A few years of life will scatter this slender line of energetic youth to the four winds.

To some this is the commencement of active, splendid service and consequent happy, useful lives. To some it is the proudest and happiest moment of sordid, commonplace existence. To some it is but a routine incident in a series of directed routine incidents that luxurious living assures.

The least satisfying reflection of the thoughtful teacher is the suspicion that all of these graduates have not found in school some abiding and worthy interest in life. Some of them have taken their school opportunities as they take their meals; a matter of courses taken as a matter of course.

The impression that our school instruction may have fallen short of giving to each graduate the incentive. as well as the ability, to do well is disconcerting. Would it have been possible to inspire each pupil with a purpose in life? Is it possible to develop a self reliance and a sense of responsibility that will mark the school graduate and assure success in spite of luxury and poverty?

The best schools are now equipped with the instruments of education in great variety and fair quality. Most of the material interests of life are represented in the curriculum. We pride ourselves in the opportunity offered the boys and girls to find themselves. Alas! Youth does not always find itself even when abundant opportunity is offered. The schools must assume the obligation of guidance. The disquieting thought that confronts us as we watch the long line of graduates is not that we may have taught poorly but that we have failed to inspire.

VACATION

Now, that the schools have closed, what shall we do next? Some one says, "Oh, take a vacation, of course!"

A vacation is all very well and good for those who need it, and for such time as is needed. But, think of a whole summer of "vacation" such as is often meant by that term! Many a person thinks of vacation as a loafing time—a time of sleepy, sloppy, lazy slumb into indolent inaction. And for the extreme nerve tension, such perfect relaxation from all activity and responsibility for two or three weeks is easily conceivable. But, for the average one of us and for a whole summer the proposition seems stupid enough.

For the boy in school, what an opportunity the summer offers for furthering his industrial or business knowledge and experience! What an opportunity, likewise, for accumulating a small reserve of capital for further schooling or other plans! In the very nature of things, such a procedure is simply a continuation of the educational process.

Education as a process is not a matter of seasons or months or lessons. It is a growth; and when growing ceases, decay begins.

For the teachers, the summer holds out also a wonderful opportunity. Vacation? Yes, but not the sleepy, lazy kind except for a brief period. Summer schools, art colonies, American and European tours, business experience, shop and trade training for enhanced income and knowledge, all lend themselves to the enjoyment of an ideal vacation.

We rest either by changing our occupations or by changing the scene and environment of our work. The greatest revival that has come to the American schools has been this new ideal of education and vacations. The teacher who goes into the business house, shop, factory, farm or bank for the summer never becomes the "peculiar" teacher who is pointed out as the helpless person who can do nothing but teach. Such person is looked upon as a leader who knows what he is about and who can do the work of the world outside of the classroom. And what a richness of experience be brings to his classes the next September! How much more he can command the respect of his board and the salary that his services merit!

Take a vacation, but don't loaf all summer. Spend the summer for the most part in some profitable employment in line of or closely akin to your field, if possible. Then when the time for relaxation comes—a brief period at best—relax with a vengeance and get ready for the real big job in September.

RESOLVED TO DRAW

The Fifth International Congress of Art, held at Paris last year passed one resolution that should interest American teachers of Art especially.

Resolved: That the practice of rapid and easy sketching be required in all examinations giving entrance to places of higher education.

It is doubtful if some of our teachers of art could meet this requirement, and it is certain that a majority of our high school graduates would be unable to sketch effectively if given plenty of time and opportunity.

Two considerations leading to this resolution by The International Congress are also of interest. One is that college faculties complain of the inability of students in

college to draw effectively. The other consideration is that authors are rarely able to illustrate their own literary productions, and they should be able to do so because illustrators do it so poorly.

The complaint of college faculties of the inability of their students in drawing must be confined to Europe. American college teachers have never shown interest enough in drawing to acquire ability or to require ability in rapid and easy sketching.

American authors have rarely attempted to illustrate their literary works but have depended upon artists of ability, who have often exceeded rather than supplemented the author's production.

The brief time given to art instruction in the American schools is spent largely on designful interests. Drawing practice has been given less and less time and attention. Appreciation of beauty and propriety in the interests of life seems of first importance in the art education of our youth.

At most, drawing is the means to the end of art appreciation and education in American schools. This is logical, and a return to the idea of ability in drawing as a measure of success in art education is not to be desired or expected.

What we may desire and expect is that drawing be made a more effective instrument for instruction in the arts.

Is there good reason why high school students should not prepare drawings outside of class hours under assignment? May not school pupils learn to sketch with fair rapidity, ease, and accuracy under insistence and assistance from a capable teacher?

We believe that great improvement can be made in this direction, and that it must be made, before the study of art in the schools is developed to the place of importance it deserves. Let us resolve to draw and to teach drawing as a means to the end of teaching art.

Not half, perhaps not twenty per cent, of the boys and girls will go through high school or college. What shall we do with the other fifty or eighty per cent? Brains in democracies are born in alleys, as well as on avenues. We must develop these brains. We need not worry about the youth that go through high school.

—Robert O. Small.

Edward M. Sullivan, member of the Boston, Mass., school committee, holds that among the things that a boy ought to learn at school is how to find a job. The Boston Traveler comments as follows: "It will take some time to develop capable instructors or leaders for this particular educational task. Cooperation between schools and employers will need to be secured in much greater degree than has yet been attained. The problem cannot be solved in a day or a year. But there can be no question that Mr. Sullivan has put his finger upon one of the weakest spots in the educational program. We wish him success in his efforts to discover and apply an effective remedy."

AMPUTATION DAY

If you were to pick up a paper and read that Mr. Brown had just completed training as a paper hanger and that the directors of the school had cut his hands off, you would swear that a practical joker had slipped one over on the editor. Yet, a similar performance goes on much of the time and "amputations" numbering into the thousands take place annually in June.

Every year many thousand boys attending high school are given instruction in mechanical drawing. They would be told (if they were curious enough to ask—which they seldom are) that they are given this instruction in order that they may "visualize quickly," "think in three dimensions," and may be "trained in constructive imagination."

The board of education loans them drawing instruments, boards, and T-squares, and the boys learn to make very neat and accurate drawings. All this is fine and no doubt leads to the aims above expressed. In the three or four years the boys spend using the drawing tools, they learn to make handsome drawings, prefer to make that kind, and are likely to look down upon the making of free hand sketches (if these are at all required).

They then graduate from high school with the ability to "visualize quickly," "think in three dimensions," and use "constructive imagination," but these abilities are tied up with the use of mechanical instruments and the kind of drawings that can only be produced through their use.

Graduation day is "amputation day" for the board of education takes the instruments away from the boys. They are in the same fix as the Frenchman who had met with an accident and had lost his arms. "How can he eat?" asked a friend. "But how can he talk?" lamented the bearer of the news.

When these boys have ideas of some device or improvement, and the desire to get them upon paper, they must hunt for instruments to make the ideas intelligible to others. Long before all the equipment is assembled the usual idea will have disappeared like the mists of early morning.

Let us do two things to avoid the usual "amputation day." Let us make it fashionable for the boys to quickly and neatly make sketches of objects in three views. Let us encourage them to do the work on any sort of paper and with no aids other than a straight-edge or rule, and a pencil compass. For a long time every boy will feel that he is being cheated if he cannot make "real" drawings without instruments. And above all let us require that he own a set of instruments if he wishes this instruction.

Under the plan suggested the boys will have solved the showing of objects in three views many more times than at present. This will result in increased ability to "visualize quickly," "think in three dimensions," and get ideas down on paper easily and quickly.

—Laurence Parker.

The Eastern Arts Convention at Syracuse

Arthur F. Hopper

The Seventeenth Annual Convention of the Eastern Arts Association took place at Syracuse, April 21-24. While a large meeting was anticipated, due to an unusually attractive program, the attendance exceeded all expectations, so much so that seating accommodations at several of the general meetings were at a premium.

General Sessions

After a preliminary conference of the Council, the first general session of the convention was addressed by Henry Turner Bailey and Dr. David Snedden. Mr. Bailey took for a topic "The Magic Realm of Art," and after a fitting introduction by President Hatch, was enthusiastically received by the audience. Lack of space will prevent a detailed account of Dr. Bailey's address. In part he said:

It becomes our duty as teachers and our duty as parents to foster every single love of little children for these extracurricular activities, that is to say, if a boy is interested in nature study, help him along. If he is interested in art, music or anything else, whatever it happens to be, whatever it has to do with this marvelous realm that the creation of mankind has made for him as his inheritance and great treasure, help him in any way you can. And in our school work it is our business to teach all the arts so that they will become open doors to this realm.

You can teach music in such a fashion that the staffs and notes and hooks and weights and sharps and flats make a barbed wire entanglement in front of the gates of music. You can teach nature study and you can dig a ditch in front of one of the best gates through which you enter. When you have children paraphrase Lincoln's address or analyze in mass "The Lady of the Lake" you are just wrecking the possibility of any one ever entering the gate of literature or poetry with any comfort.

But on the other hand, it is possible for you to teach designs in music, nature study, poetry, anything that you have to do with the arts—it is possible for you to teach every one of those so that the child will have free access and get the vision that will satisfy his soul.

It is our business as teachers to open the eyes of children to these great gateways in which they enter in.

I think sometimes if I could make myself worthy of an epitaph to put on my tombstone I would like to have it taken from an incident in the New Testament. You know there was a man born blind, whose eyes were opened, and they said, "This man is a sinner because He opened your eyes on Sunday." And the man made this immortal reply, "Whether He be a sinner or not, I know not, but one thing I know, He opened my eyes." And I think the greatest epitaph that the teacher could have is the statement from his own pupil. "Whether he be a sinner or not, one thing I know, he has opened my eyes."

If you can open the eyes of the children to their great heritage and take them by the hand and lead them through the gate to this immortal country you will have their eternal thanks and will have won the greatest tribute for the future generation (because they don't appreciate it now). You can win for your own people, future citizens, because you have helped the children in the public schools, and therefore another generation, to realize this idea: as Superintendent Hughes said, "You have given the means of living the larger and more abundant life." You will have given them the key to the realm which alone gives to the human spirit permanent satisfaction.

Dr. David Snedden followed Dr. Bailey and in an address full of inspiration and forcefulness gave some of his views on modern educational tendencies. In part he said:

Let me speak to you first of a tendency that is social rather than educational and yet that has the profoundest of consequences for education. It is a truism, of course, that we Americans are becoming a more prosperous people. Some other things are going along with that, however.

Do you realize the average longevity is very rapidly increasing, probably the average age of all American citizens since the beginning of our own century has increased ten years. It seems rather incredible, yet that fact is supported by very excellent statistical evidence. Our families are growing smaller steadily. We have largely curtailed immigration. It may not be so much in evidence, but I am sure it is true that the pride of Americans in their children is large and the ambitions for the futures of their children are steadily becoming finer and better.

Some other tendencies in this connection are significant. Employers of labor have been largely shamed away from employing quite young labor. Legislation in many of our states is practically making it impossible for employers to employ young people under 16 years of age.

Putting all of these factors together, this is the social tendency to which I refer, the tendency on the part of America to insist on prolonging the school life, not of a fraction of our young people, but all of them, a tendency that is administered to by the diminishing size of families, the growing prosperity of the typical American family, the increasing number of years in which we have to do our work as adults, reluctance to employ young workers, legislative protection for young people—all of these are simply the manifestations of social tendencies to extend upward the school life and, therefore, the opportunities of school education of our young people.

Most of you, I am convinced, will see in two-thirds of the United States, school attendance obligatory to all of our population to at least 16 years of age and presently to 18 years of age.

From the standpoint of the histories of peoples that is a social tendency of very profound educational consequences.

One of the most profound responsibilities resting upon us will be to discover methods and ways and means of school education for this future school attendance that will be as good for the young people of low intelligence as perhaps a good deal of our recent education has been fairly good for people of high intelligence.

The secondary school, like the old American college, has been supposed to contribute its quarter to the fineness of America by the training for leadership, or the education of those who were to be our leaders by virtue of their natural gifts and favorable start in life. And there is a great deal in the American high school today that renders it in a measure unfit to take care of the educational needs of the young people from 14 to 18 years of age who are going to throng our schools more and more, but who are less than average in native ability.

Every year I study these matters and every observation I make in this and other countries of vocational training convinces me that whenever the time comes in the life of a boy or girl, a young man or woman, when it is appropriate that vocational training should be given, there are all sorts of reasons, psychological and others, that vocational education should be of a very intensive and very direct and very purposive sort, mixed up, indeed, with no other form of education.

We have achieved that standard in the professions and need to achieve it in other crafts and lines of education. And we can do it.

And sooner or later we must get away from the imitation types of vocational education that we have in our schools now. We shall get there only by the highly specialized schools with very intensive training.

May I predict that you are going to see many things in education in America? You may not believe it now. There will be far more flexibility of educational offers, even in the fourth, fifth, and sixth grades, as we now have it in our American high schools. And a good part of that will come as a result of agitation.

On Thursday morning, Miss May Robinson, art director, Washington, Indiana, addressed the general session, taking for her topic, "Art in the Community." Miss Robinson in a very interesting manner told what could be done even in a small community to get people to better appreciate and understand art. She said:

When I came to my little home town to teach art after I had graduated from Pratt Institute, I was very much disappointed that I spoke a language that the people there didn't understand, and when I would show some of the work I had done they would smile and say, "Oh, how nice. What is it?" And I found that I was to teach the whole town instead of just the children.

Miss Robinson then explained how she accomplished this task by means of Art Leagues, picture exhibits, lectures, plays, working with the business men of the town, etc. She brought her address to a close with the statement that "Art is such a big thing, such a practical thing, a thing that everybody wants whether they know it or not, that we have to give it to them all the time and make them understand it. And it does come out all right in the end because art is as great a truth as self, because it is truth and truth is mighty and will prevail." Her message, which was full of inspiration and help, was enthusiastically received.

Dr. Snedden followed Miss Robinson, taking for his subject, "Criteria of Values for Junior High School Industrial Arts." This proved to be another forceful, clear-cut message of the type that we always look forward to from Dr. Snedden. After bringing out the fact that a great deal of our progress in education at the present time and for a number of years past has come through the ardent efforts of people whom we might describe as specialists in fields of education, he emphasized the need for scientific curricula making, stressing the fact that we should consider analytically the determination of values. He then analyzed the industrial arts in the junior high school, mentioning eight kinds of values.

After analyzing these values very carefully he urged his audience to do some clear-cut thinking in connection with aims and objectives, etc., and suggested that in the next few years we should try to rely less on catch words and slogans and give more time to the study of values, not in reference to the boy, the child or the girl, but in reference to types and places in our school personnel, so that this whole method of approach will prove of great value and eventually give us a basis for far more flexibility in the junior high schools than we have yet dreamed of. It is along this line and no other that we are going to get by the secrets, namely, educational values and criteria based upon social values.

On Thursday evening the general session was addressed by Dr. Frederick G. Bonser, Teachers College,

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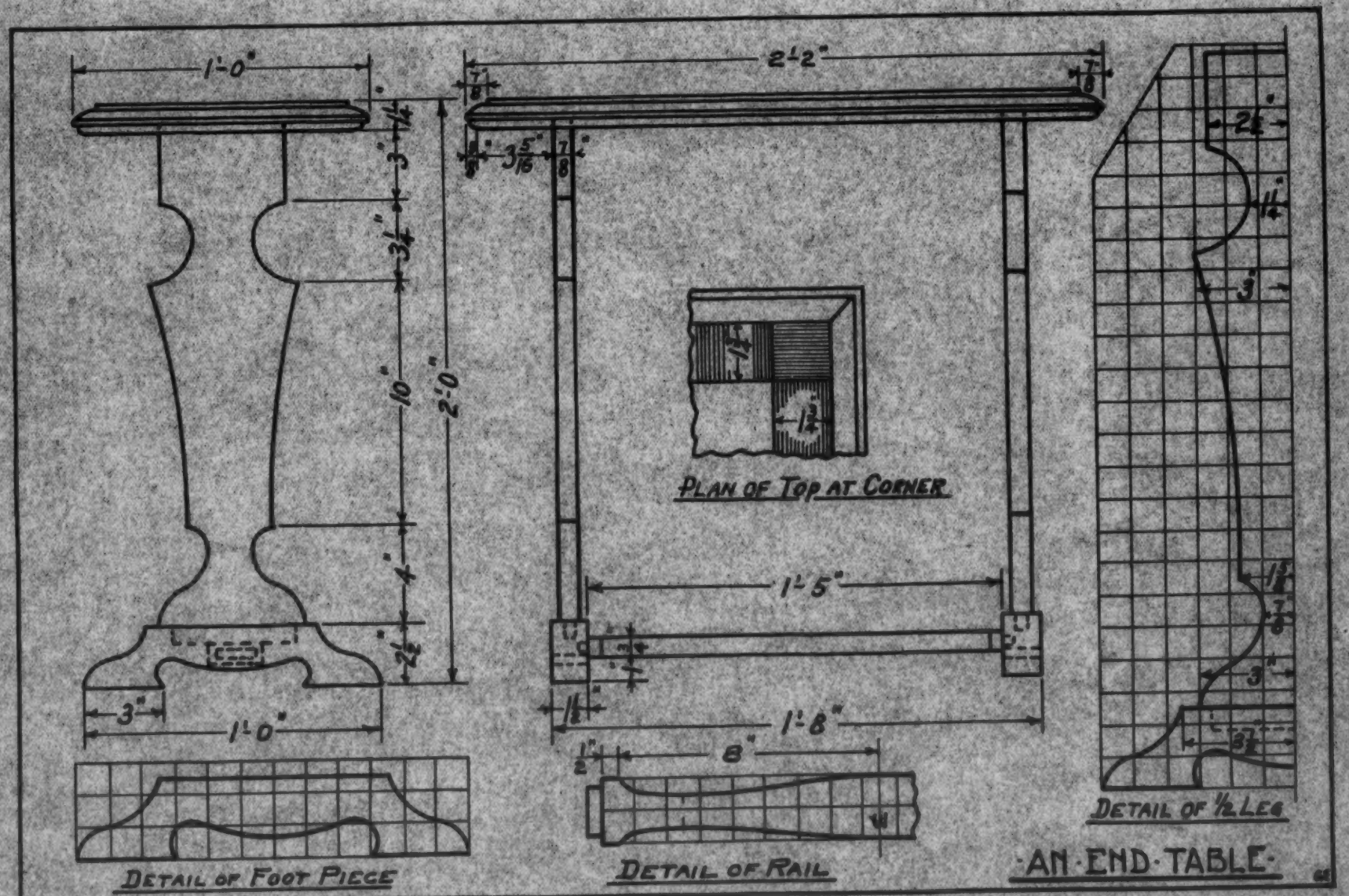

AN END TABLE

Drawing by Francis E. Joss, San Antonio, Texas.

For Details See Page 254, Industrial-Arts Magazine, July, 1926.

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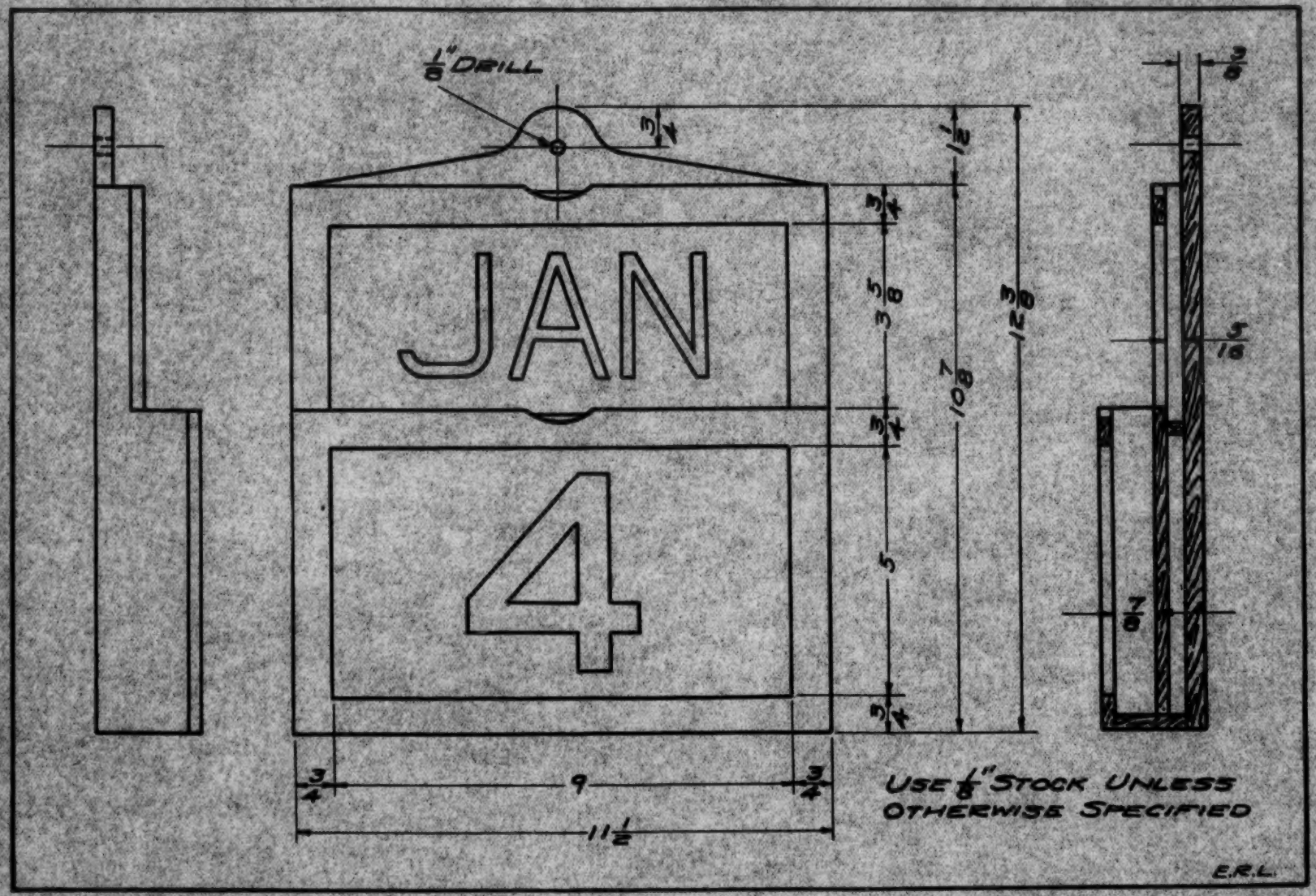

Drawing by R. L. Hill, Saginaw, Mich.

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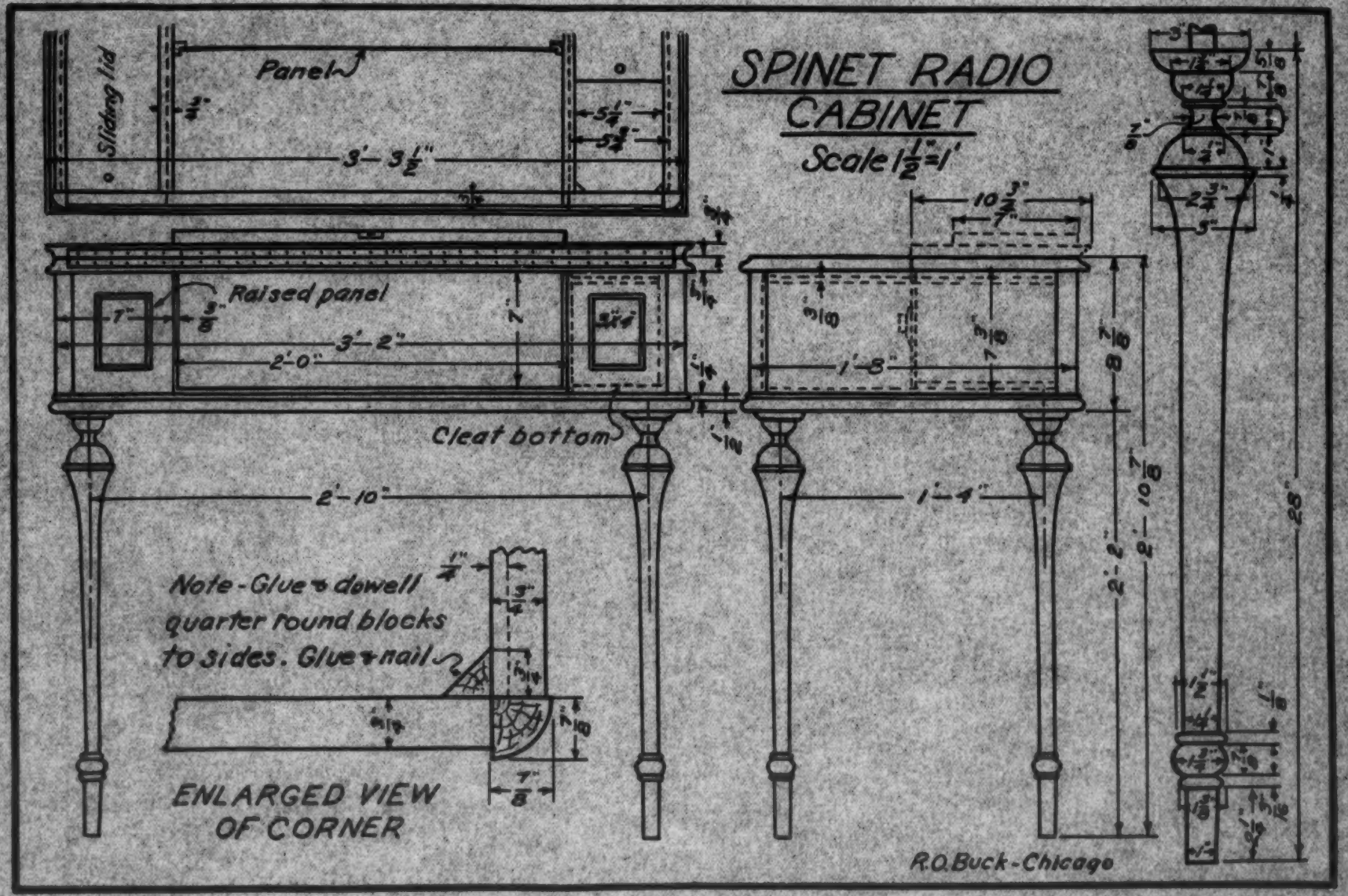
SPINET RADIO CABINET

Scale $1\frac{1}{2}" = 1'$



Designed by R. O. Buck, Chicago, Ill.

For Details See Page 214, Industrial-Arts Magazine, July, 1926.

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TRACING SUPPLEMENT No. 15.
THE INDUSTRIAL-ARTS MAGAZINE.
JULY, 1925.

The division of the alphabet and the numerals into groups, based on construction, makes it easy to master lettering. Good lettering depends largely upon correct outlines and a uniform ratio between the areas of the letters and of the openings. The letters in the following groups are with a few exceptions five units high, four units wide, and spaced one unit apart. The inclined letters have a slant of 2 units to 5, or 70°.

Designed by Floyd D. Slater, Rochester, N. Y.
LETTERING CHART.
Industrial-Arts Magazine, July, 1925.

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his subject being, "The Arts as Opportunities for Creative Adventure." After defining adventure he went on to say that "in the field of arts there is everything to be given and little to lose by adventure." There are chances that realized results may be less than anticipated achievements, but there are no chances for complete failure if you go forth intelligently and resolutely upon your adventure. You alone can insure your own success if you choose wisely your adventure.

Inherent in all normal human beings is a desire for creative experience. We all have the creative wish to shape things, conditions or events to our own ideals in some phase of life activity. The creative imagination visions purposes or goals of what we wish to do or become. If we educate our imaginations and our intellects to see adventures within the range of our capacities, and also to see and take the steps necessary to carry forward the adventures, they will be rewarded with success.

The designer and decorator, as such, are, from the outset, dedicated to creative adventure. Unless that which they do is creative—is more or less original—they achieve little success. But even among these dedicated to sail upon the limitless seas of creative adventure, all too many but paddle along the shores and never go far from the landmarks of familiar European or Oriental models and styles. That is why we have so little American art.

After considering several art fields in detail, Dr. Bonser, in conclusion, urged that all of the arts are opportunities for creative adventure. In every art field, whether one serves as a producer or as an appreciative consumer, success lies in the use of creative imagination, creative thinking, and creative selection and arrangement.

Mr. W. A. O'Leary, assistant commissioner of education, Trenton, N. J., addressed the general session on Friday morning, taking for his topic, "The Vocational Needs of the Industrial Worker." Speaking of the demands which society makes upon the worker, he said:

The first demand is that they shall be able to produce and be vocationally efficient. It is difficult to define this type of efficiency as it involves the human spirit, and there are as many solutions as there are men, multiplied by the jobs at which they work.

If, however, we ask, "What does the worker need to lift him out of the class of unskilled and consequently casual employment on to the higher levels of industry?"—and these are the levels with which the vocational school at present largely deals—we can give at least a partial answer. Setting aside for the moment the question of health and certain personal characteristics there are three outstanding things that mark the successful trade worker. First, he must possess manipulative skill, technical knowledge and trade judgment; second, he must have the ability to use these acquirements effectively as a matter of habit; and third, he must take pride in his craft.

The worker in industry is part of a great economic force, so big and so complicated that sometimes he seems of no more importance than a cog in the wheel he watches turn. If he is to be more than just a tool in production he must have some appreciation of the economic foundations of society. He must know the meaning of social wealth, the function of capital and labor, and the laws of supply and demand.

More important than technical skill or industrial knowledge, however, is character. Industry needs men who are honest, sober, and thrifty even more than it needs men who can stoke a boiler or run a milling machine. Qualities of character enter into production just as truly as technical skill.

Mr. O'Leary also spoke of the problem of the unskilled worker and the increasing number of highly specialized jobs due to improved machinery and the subdivision of manufacturing processes. After drawing a vivid picture of the conditions under which many of our unskilled workers live, he discussed means by which these conditions might be improved, stressing social education and education in homemaking as well as healthy recreation.

In conclusion, he pointed out that the school is only one agency concerned in the training of an efficient worker. Society, industry, and the worker himself all have equal stake in the understanding and each must bear its share of the responsibility. Then, and then only, will the vocational needs of the industrial worker be successfully met.

Miss Leila Mechlin followed Mr. O'Leary and spoke on "The Eternal Propaganda of Beauty as Conducted by the American Federation of Arts." She began with a quotation from Mr. Loche: "There is only one art. It is a mighty force. If there were some means of organizing it, coordinating the efforts of painter, musician, architect, poet, so that they all could be brought into one sociological focus, its influence would be immeasurable. We need a great organization for the conservation of the spirit. It should be generously all-embracing, unselfishly educative, in all its elastic superficies in touch with the great social mass—very potent in its universality of

ARTHUR F. HOPPER,
President-Elect of the Eastern Arts Association.

munificence. It would carry on, in a word, the eternal propaganda of beauty." Miss Mechlin then went on to describe how the American Federation of Arts has been carrying out this ideal.

Dr. C. A. Prosser, director of Dunwoody Institute, Minneapolis, was the chief speaker at the Friday evening banquet. Dr. Prosser said in part:

We are turning from pure art to applied art. Not that pure art is perfectly wonderful, and it still will be performed by the people who constitute the genius of the world, who not only have that everlasting sense of beauty in their souls, but the power to execute it on a high plane.

The big problem is the problem of applied art and the big problem is the administering to the happiness of 115,000,000 American citizens and the problem is to train 115,000,000 American citizens to be intelligent, happy consumers of art so that they will find in color, shade and form, and adaptability and finish that administration as to their souls in a wide field, new field, and a new retreat from the decorous and the conventional monotony.

You are never going to make 115,000,000 people in America love art by having them all execute it.

Dr. Prosser feels that the time is coming when America is going to do the same as the French people. We are going to do as they have done toward an economical social step. We are going to find very early that the people, some of them, have talent, and we are going to discover those who have the talent.

Surely, we are going to arrive at this without asking people to do for eight years what they can't do and never could do and during which time they are losing their taste. We are going to put those people aside and train them intensively in their talent. They are not going to be Rembrandts and they are not going to be Angelos or da Vincis, but they are going to be very successful commercial designers and they are going to be the people in different lines of work after having had some practice in the application of their art to appropriate material. They are going to control on a larger scale the production of more beauty of things with better finish and color and adaptability and form. These things are going to be poured out so that neither landscape nor interior will offend one or the other.

Then we are going to take these other children who are coming along, and their name will be legion. We are going to train them in the appreciation of art, the appreciation of the use of art, and we will crowd them with the things that are different. We will tell them of the thrills of color and form and proportion and figures and all the rest of the things that make the printed page worth while.

To my mind, education is not for the purpose of getting individual accomplishment. All education is for the purpose of helping the race to live and they live better and longer and deeper and more richly when there is an escape from the decorous and the conventional. I want to say that I don't believe the school children of our schools will ever escape from the ugly monotony of dreary walls and draperies at home until the American teacher of art escapes from the decorous and the conventional. The purpose of artists is to make art, and the purpose of art teachers to teach people to love art.

The last general assembly of the convention, held on Saturday morning, was addressed by Mr. Ralph M. Pearson, who gave a very interesting illustrated talk on the "New Tradition in Prints," which ended with a lively discussion from the floor.

The general session concluded with a talk by Mrs. Edith J. R. Isaacs, Editor of the Theater Arts Monthly. Mrs. Isaacs chose for her topic, "The Theater Among the

Arts," which proved to be very enlightening and also created some discussion.

Sectional conferences were held on vocational education, art, correlation, manual arts, home economics, part-time education, and printing. All of these sections had unusually attractive programs, for which the chairmen of the various groups deserve much credit. As with the general meetings, the attendance was so large that it was difficult to find seating accommodations. Space will not permit of a detailed report of these meetings.

Commercial and Educational Exhibits

All of the commercial exhibits were displayed on the top floor of the Hotel Syracuse, adjoining the section meeting rooms and the general assembly hall. This proved to be an ideal arrangement. These exhibits have now become quite an important part of the Eastern Arts Convention and are a great aid to the members of the Association, as it gives them an opportunity to examine at their leisure the various products and to become personally acquainted with the representatives of the different firms exhibiting. One of the features of the commercial exhibit this year was the awarding of valuable prizes by the exhibitors, which was much appreciated by the winners.

Various schools throughout the country exhibited specimens of their work. As usual, these exhibits attracted much attention as did the members' exhibit. The work of the pupils and members of the Association was in every way commendable.

The entertainment features of the convention were well taken care of by the Syracuse local committee. Orchestras from the public schools, the Syracuse University orchestra and glee club, etc., were very much enjoyed. The dance put on by the Commercial men and the one given by the Association proved to be highly successful.

Much credit is due Mr. Kidd, supervisor of special activities in the Syracuse Schools, and his committee, for the part they took in making the convention a success.

President George F. Hatch proved himself to be both a dignified and cordial president, and thanks to his careful and painstaking work, everything ran very smoothly. As usual, our worthy secretary, Frank Mathewson, was untiring in his efforts for the success of the convention. He gave unstintingly of his time throughout the entire year and the growth of our Association can be traced directly to his efforts.

The following officers were elected for the ensuing year:

Arthur F. Hopper, Plainfield, N. J., President.
Theo. M. Dillaway, Philadelphia, Pa., Vice-President.
Frank E. Mathewson, Jersey City, N. J., Secretary-Treasurer.
Miss Florence M. Kleg of Darby Township, Pa., was elected to serve on the Council for one year.
Mr. Robert A. Campbell of New Jersey, Mr. Joseph Wiseltier of Connecticut, and Mr. George Gaither of Maryland were elected to serve on the Council for three years.

The next convention of the Association will be held in Philadelphia some time in the spring of 1927.

The Santa Maria

The Rigging—Conclusion

Charles L. Dacey, Madison Junior High School, Newark, N. J.

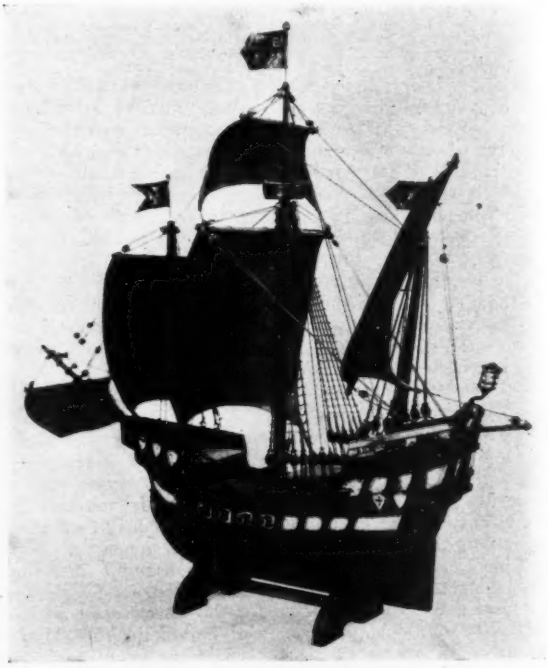
The rigging is a vast subject in itself, and since the author is neither an old seaman nor an authority on the subject, the facts will be presented as they have been gathered in an extended study of the Santa Maria's rigging and from other sources.

Such details as cleats, pulleys, and dead-eyes, should be made while the ship is drying. The making of these parts is shown in Fig. 4 and needs very little comment. They are made of some straight-grained hard wood, preferably a wood of dark color. Pulleys are mounted with No. 20 copper wire uncovered, while the dead-eyes are strung with No. 22 cotton-covered copper wire or fine strong thread. All shaping is done with a knife and a half round file. All holes are bored with a very small drill, or a brad with the head clipped off, used in a hand drill. For this ship, approximately 36 pulleys, 40 dead-eyes, with three holes, six with single holes, and twelve cleats are needed.

The first step in the rigging is the binding together of the dead-eyes. On the real ship the three holes in these blocks are used to tighten the ends of the shroud ropes, and the shroud ropes are put on first; but on a small model, if wire is to be used to string the dead-eyes, this process is accomplished first, and the tightening is done when the slip knot is made in the end of the shroud rope, around the upper dead-eye. If thread is used to tighten the dead-eyes, then the shroud ropes with the upper dead-eye attached are mounted first. The lower dead-eye is fastened with wire in place of chains to a tack, or escutcheon pin, as shown in Fig. 4. The wire loops around this dead-eye pass through the hole in the platform and then to a tack. The gap between the upper and lower dead-eye is then drawn together with thread. Either the thread or the wire method can be used.

An eighth of an inch of the wire is clinched in back of the dead-eyes at each end, to hold it in place as shown in Fig. 4, while the thread, if thread is used, is knotted to start with, and the last round is tied to the shroud rope just above the upper dead-eye.

A simple method of attaching the shroud ropes to the ship's top is shown in Fig. 4. The method is not entirely correct as the ropes are generally either attached to a rope garland, or pass over a cross tree, which is a part of the ship's top. Usually each shroud rope is tied separately, one on top of the other, alternately from one side of the mast to the other, all passing over the cross tree and around the mast, but on a small ship like this, top string, which is used for these ropes, takes up so much room



MODEL OF THE SANTA MARIA.

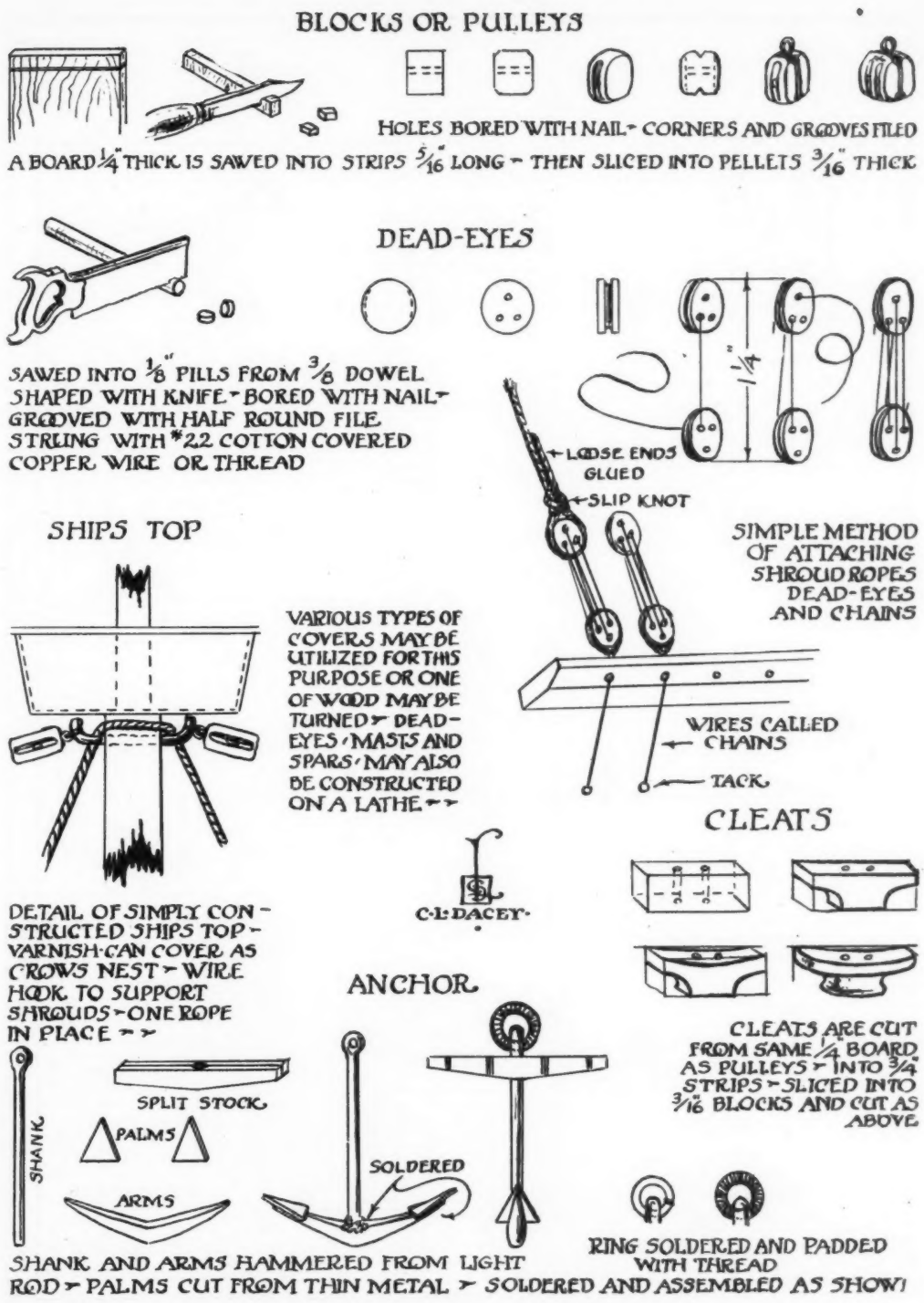

BLOCKS OR PULLEYS
HOLES BORED WITH NAIL - CORNERS AND GROOVES FILED
A BOARD 1/4" THICK IS SAWED INTO STRIPS 5/16" LONG - THEN SLICED INTO PELLETS 3/16" THICK
DEAD-EYES
SAWED INTO 1/8" PILLS FROM 3/8 DOWEL
SHAPED WITH KNIFE - BORED WITH NAIL -
GROOVED WITH HALF ROUND FILE
STRUNG WITH #22 COTTON COVERED
COPPER WIRE OR THREAD
1 1/4"
LOOSE ENDS GLUED
SLIP KNOT
SIMPLE METHOD OF ATTACHING SHROUD ROPES DEAD-EYES AND CHAINS
WIRES CALLED CHAINS
TACK
SHIPS TOP
VARIOUS TYPES OF COVERS MAY BE UTILIZED FOR THIS PURPOSE OR ONE OF WOOD MAY BE TURNED - DEAD-EYES, MASTS AND SPARS, MAY ALSO BE CONSTRUCTED ON A LATHE - -
CLEATS
C. L. DACEY.
DETAIL OF SIMPLY CONSTRUCTED SHIPS TOP - VARNISH-CAN COVER AS CROWS NEST - WIRE HOOK TO SUPPORT SHROUDS - ONE ROPE IN PLACE - -
ANCHOR
SPLIT STOCK
SHANK
PALMS
ARMS
SOLDERED
CLEATS ARE CUT FROM SAME 1/4 BOARD AS PULLEYS - INTO 3/4" STRIPS - SLICED INTO 3/16" BLOCKS AND CUT AS ABOVE
RING SOLDERED AND PADDED WITH THREAD
SHANK AND ARMS HAMMERED FROM LIGHT ROD - PALMS CUT FROM THIN METAL - SOLDERED AND ASSEMBLED AS SHOWN

FIG. IV. DETAILS OF THE RIGGING OF THE SANTA MARIA.

that that method would make a clumsy job at the best. The simple method shown, that of providing a single hook-shaped crosstree big enough to accommodate eight ropes, each rope being continuous and serving both sides of the ship, was found to be the best. For example, each rope would start from the top dead-eye on one side, pass up through one side of the hook, half way around the mast through the other side of the hook, and down to the corresponding top dead-eye on the other side. In this way, economy of space and time is also accomplished.

A varnish can cover, with a quarter-inch hole drilled through it, and perhaps reinforced with a wooden disk inside is used on a crow's nest, as shown in Fig. 4. Other small tin covers may also be used, or a wooden one may be turned out on a lathe.

The foregoing description is for the first eight shrouds; the last two are constructed the same way, but are attached to the top mast with slightly finer string, to act

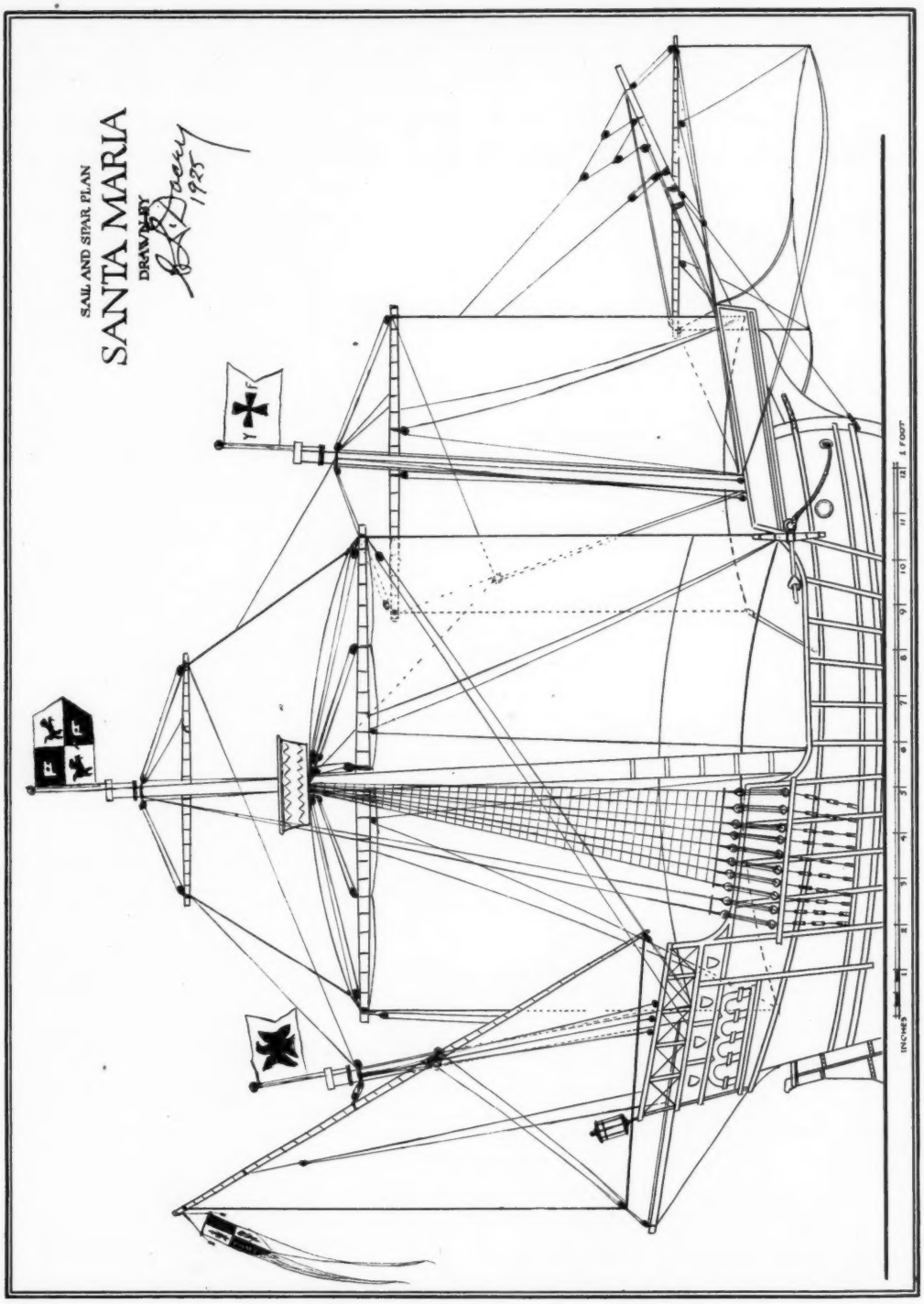


FIG. V. SAIL AND SPAR PLAN OF THE SANTA MARIA.

as a guy for that mast. Those on the front of the ship are attached only to small screw-eyes, and to a hole in the top of the foremast. Those in the rear are attached from single shrouds, with single holes in the center of each of them to a hole in the top of the mizzen mast.

The ratlines, or ladder ropes, in the main shrouds can now be put on. These are sewed and looped through the ropes from one side to the other with black carpet thread, starting with a knot and passing through each rope with a tied loop. Care should be taken to see that the ropes retain their alignment from top to bottom by ratlines not too tightly drawn. There should be a wire spacer at the bottom of each side, which is tied on by cross ties at each shroud. This part is rather difficult to accomplish on a small craft and can be left out.

The rest of the rigging can now be put in place by careful observance of the spar plan. Start with the principal ropes; put them in place; then pick out the next essentials. By considering a small part at once a clearer conception is obtained.

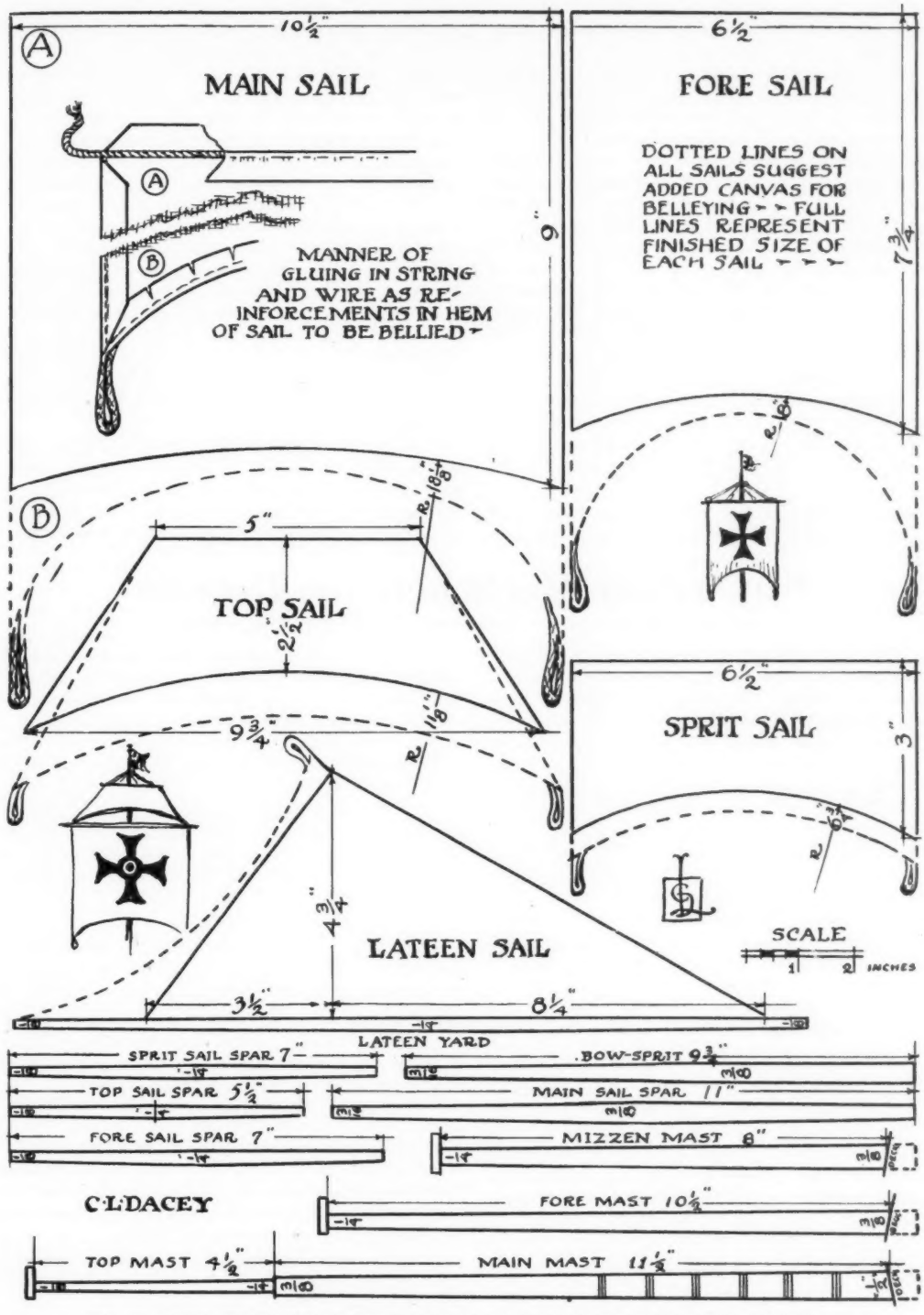

MAIN SAIL
FORE SAIL
DOTTED LINES ON ALL SAILS SUGGEST ADDED CANVAS FOR BELLEYING - - FULL LINES REPRESENT FINISHED SIZE OF EACH SAIL
MANNER OF GLUING IN STRING AND WIRE AS RE-INFORCEMENTS IN HEM OF SAIL TO BE BELLIED
TOP SAIL
SPRIT SAIL
LATEEN SAIL
SCALE
INCHES
LATEEN YARD
SPRIT SAIL SPAR 7"
BOW-SPRIT 9 3/4"
TOP SAIL SPAR 5 1/2"
MAIN SAIL SPAR 11"
FORE SAIL SPAR 7"
MIZZEN MAST 8"
C·L·DACEY
FORE MAST 10 1/2"
TOP MAST 4 1/2"
MAIN MAST 11 1/2"

FIG. VI. SAILS, SPARS, MASTS, BOW-SPRIT, AND LATEEN YARD OF THE SANTA MARIA.

The sails are cut to size according to the drawing, allowing ¼" all around for a hem. This hem instead of being sewed is turned over upon the sail itself and glued. A piece of top string or hemp cord is glued inside of this hem on the top, and a piece of No. 20 gauge cotton-covered copper wire is glued in on the bottom and part way up both sides, to shape the bottom of the sail, and to act as an anchorage if the sails are to be bellied. Cold glue is used.

When this is dry, they are bent around a form which can be any circular object of the right diameter. The author used a roll of tissue paper for the form over which to bend the main sail. These forms can be padded and shaped carefully until the required curve is obtained. Care must be taken to see that no wrinkle or sharp edges show on the sail. It should look as though the wind were blowing it into that particular bellied appearance.

When everything is ready, each sail is tied securely in place and given a coat of thin, hot glue. When this is cold and hard, it is given a couple of coats of thin shellac and allowed to dry. It is then removed and shellaced on

the concave side, after which it is given a coat of brownish-gray flat paint.

When all is dry, the crosses in vermilion and other medieval characters can be painted in the center of the sails in bright colors. When the decorations are dry, the sails are aged in the same manner as the hull. The sail should be attached to the mast by two pulleys in the center, and two pulleys (one on each end) for raising and lowering the sail. In addition there are two on each end for tacking the sail in the wind. The real ships, however, had another pulley half way between the mast and the end of the spar on each side.

However, in bellying the sails, it will perhaps be necessary to run a hook rod through the spar and the mast, to hold the spar in its proper place. Wire can be used for this purpose, and can be pressed through a tight hole with a pair of pincers.

The rod which extends in the rear is of brass. It has a hole in the front to nail to the deck, and one in the rear to hold the pulley and the guy rope which braces it from underneath. The pulley guides the rear end of the lateen sail.

The guns, one on each side located in the biggest hole near the front, are made of ⅜" dowels. A shallow ⅛" hole is made in the outer end; two rings or knurls are whittled on this end and it is painted gold and aged. They are lodged inside by a hole in one of the reinforcement blocks added for that purpose, when the hull is being built. The opening for the gun on this ship is round, but usually they were square and provided with a square door which closed the porte when the gun was withdrawn. These square portes as mentioned before were called dead-lights.

In compiling an article of this kind, it is not always possible to cover the various steps necessary to the entire completion of the project; some things must be left to the reader's ingenuity. However, it is hoped that the material described and shown will aid the builder, and enable him to visualize the numerous stages in its construction.

The variety of different types, the periods of growth in the transition of these ships, and the scant knowledge left by the ravages of time, all aid in giving the model builder a modest amount of license to vary the design according to his own ideas.

It will be hoped, therefore, that his false fears will be dispelled, and he will proceed to construct his model with much the same boldness that characterized the explorers of old, and enabled them to guide the real ships to unknown coasts in their conquest of new worlds.

"Industrial Mechancis" in Detroit

Mr. Trybom Develops a New General Industrial Arts Course

The Vocational Education Department of the city of Detroit has developed a new type of course in the general high schools, which is worthy of attention. It is designated "Industrial Mechanics" or a "Let's Know Detroit" course. It is in reality a development and expansion of the older type of industrial arts courses, usually offered in metropolitan high schools, with a strong prevocational slant and specific application to a local industrial situation.

In describing the new course in the Detroit Educational Bulletin, Mr. J. H. Trybom, in charge of Vocational Education in the Detroit high school, writes:

The industries of Detroit have made us the fourth city of the nation. The new courses therefore deal with the following problems:

1. The relative importance of an industry in the growth of our city and its relation to other industries.

2. How the raw materials used in the industry are affected by different processes in their manufacture.

3. The organization of plants.

4. How the common tools and machines are operated, given through practical experience in school shops.

The purpose of these courses is to give an intelligent understanding of the industrial world surrounding us. This knowledge probably forms a better means of contact with the men we meet than the knowledge acquired in any other subject of the high school curriculum. Knowledge that can be applied and made use of continually in this way would seem to contain, to a great extent, the cultural values so often spoken of in connection with a high school education.

The outstanding reasons, however, for offering these new courses in industrial mechanics in an academic high school is to meet the increasing demand for industrial information as a supplementary education in a large number of professional, commercial, and industrial callings, such as law, engineering, salesmanship, office positions in manufacturing plants, drafting, and the like. Greater efficiency in these callings is attained by a knowledge of tools, materials, operations, and principles underlying production.

To ascertain the actual need for a course of this nature, a survey, involving interviews with over two hundred representatives of professional, commercial, and industrial interests in Detroit, was made in 1923. This survey demonstrated that these men were mutually agreed as to the desirability or necessity of having our secondary school pupils acquire:

1. Technical knowledge pertaining to the understanding of tools, machines, materials, operations, and principles involved, with special reference to the needed applications to each class, group, and individual concerned.

2. Vocational knowledge pertaining to the conditions, processes, and relationships in present-day commerce and manufacture, and that this knowledge should be provided through concrete experience and related study.

3. Occupational knowledge pertaining to the nature of work, qualifications and training, labor conditions, health problems, future opportunities, and the like, in connection with the other studies as a basis for the intelligent choice of study and life work. In this connection, it should be pointed out that the large majority of the persons interviewed insist that this type of purposeful education and training in the principles of applied science, mathematics, and mechanics will provide for more rapid advancement in each occupation chosen.

As a convenient arrangement for the organization of our shop equipment the industries of Detroit have been classed roughly in five large groups.

A. *Metal Industries.*

The blast furnace, foundries, brass and copper mills, machine shops, and the sheet metal industries are studied, showing how iron, steel, copper, brass, sheet metal are affected by different processes in their manufacture.

B. *The Automobile Industries.*

There are about 20,000,000 automobiles in the United States today, and the number is steadily increasing. There is not another phase of our industrial development that so directly and indirectly affects so many people as

does the manufacture, use, and maintenance of the automobile.

Our entire amazing industrial development of the last half century is the outgrowth of a vast increase in the knowledge and use of scientific principles. The study of the automobile as a unit of subject matter in industrial mechanics offers an unusually fertile field for the student to satisfy his natural craving to know the "how" and "why" of some of the simpler elements of physics and chemistry. In this form of instruction these sciences become a part of the life of the pupil. He learns their underlying principles with a very keen interest and not as cold, abstract problems, because he can see their immediate and practical application.

C. *The Building Industries.*

By actual work with building materials and through class discussions the student learns how building is actually performed in his community and also the value of different materials for different purposes. This enables him to tell good construction from bad, and is a decided aid in case he wishes to build for himself, or buy a house later in life.

He learns to read intelligently blue-prints and specifications for simple buildings, and to make his own sketches and estimates. In addition, he is taught what is meant by such terms as abstract, deed, contract, lien, release, etc., and to employ this knowledge for his own protection. He also acquires some knowledge of modern methods of financing a building. Through a study of the building code he learns the requirements demanded by the city.

D. *Electrical Construction.*

The work in the electrical unit of the industrial mechanics course is designed to carry with it information of a cultural value, vocabulary, and some insight into the practical work which is involved in electrical construction.

It gives a vocabulary of technical terms and expressions, enabling the possessor to discuss intelligently ordinary electrical matters. It acquaints him with such things as high and low voltage, loads, and transforming induction. It furnishes a conception of the work done in the field of electricity, and gives an idea of the lines which future research and invention are apt to follow.

It acquaints him with the dangers involved in electrical things, teaching him where there is danger and where there is not. It illustrates the principles of electricity in such common apparatus as motors, generators, transformers, and radio, treating these on the engineering level rather than from the tinkering angle.

E. *Woodworking Industries.*

Although the woodworking industries may have contributed less to the growth of the city than the metal industries, some knowledge of the use of common woodworking tools and of the relative values of the various materials used in these industries would seem to have a significance justifying them as part of the industrial mechanics courses. Pattern making has been of special importance in the growth of the city.

The industrial mechanics courses are outlined for four semesters' work, five 45-minute periods per week, and are designated as Industrial Mechanics, one, two, and three.

The first year is devoted to a definitely outlined course of study covering a general survey of the industries, or as far as the school equipment allows. During the second year opportunity is given to students to specialize in some chosen activities for which they show special aptitude and interest.

The instruction is given in a "general" shop with a great variety of equipment for the various lines of work, or in the specialized shops now equipped in most of the high schools, by organizing the instruction in such a way that it shifts from one shop to another.

The information represented by these courses is provided through suitable printed matter and reference material, group excursions, student reports, class discussions, talks by specialists, and shop practice.

The great industrial development of Detroit has been gained by means of the metal industries. The principal products of the city issue from the machine shops, the forge shops, and the foundries. These industries have been the main factors in making Detroit what it is today, one of the outstanding manufacturing cities of the world.

A TEACHING AID USED IN WOOD FINISHING

Wm. F. Haefner, Baltimore, Maryland

If you have a boy who is careless in finishing his work, who does not want to sand his project, who cannot see the difference it makes in the finish when sanding across the grain, who does not want to erase or get rid of pencil marks, or scrape off glue that might be on the project; or if you have a boy who becomes discouraged after his project is finished, because it does not look as good as it might have looked, make and use the following teaching aid. This can be prepared before each class, or it may be one kept in the shop and referred to from time to time.

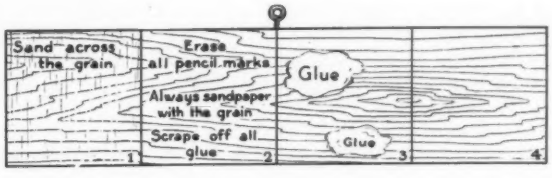
Plane a piece of soft wood (bass, poplar, etc.) to the dimensions of three inches wide and twelve inches long. Sand one of the faces. Divide this face of the wood into four equal parts, scribing lines across the face, using a knife or some other sharp tool.

Sand across the grain with coarse sandpaper in the first square.

In the second square, write or print the following: "Erase all pencil marks. Always sandpaper with the grain. Scrape off all glue."

Spread a little glue over part of the surface of the third square.

Leave the fourth square as it is.



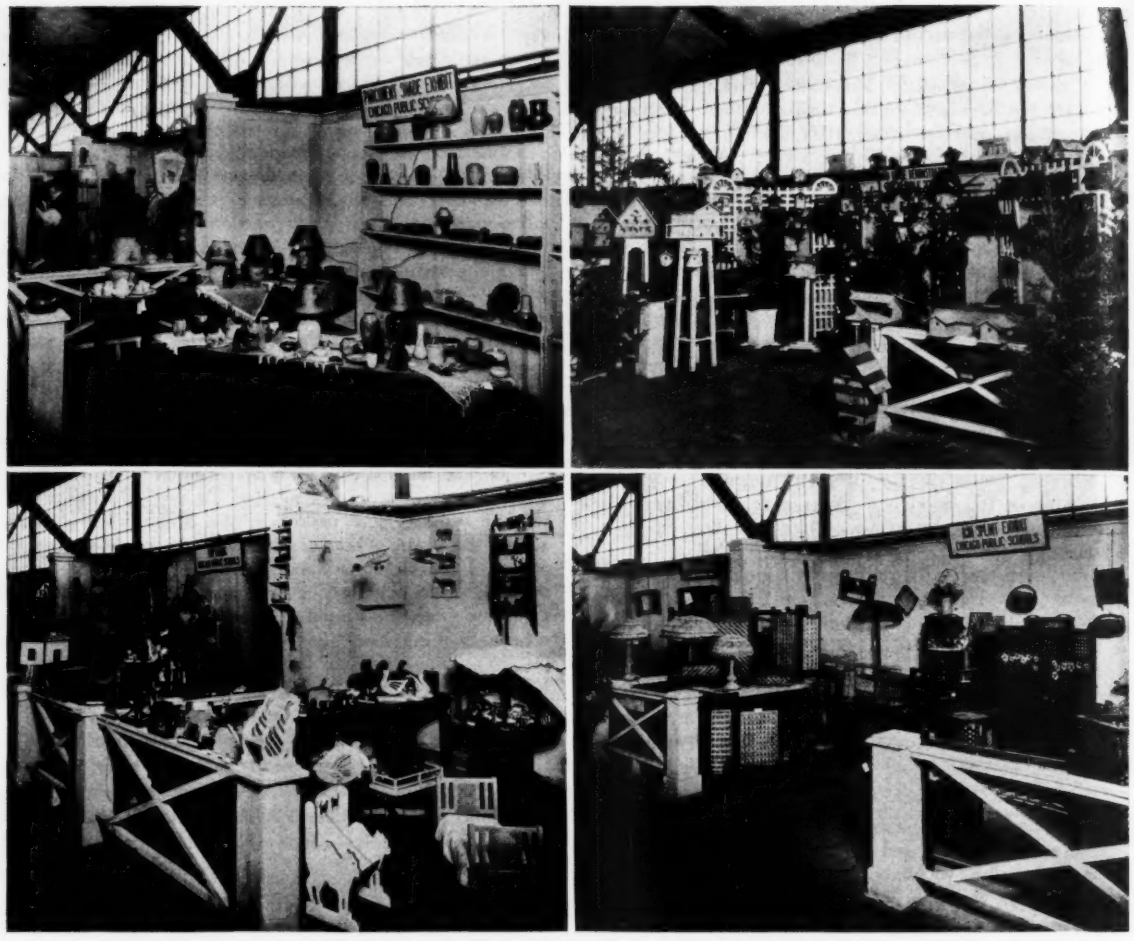
If you wish, on the other face, sand one-half of it across the grain; do not touch the other half.

Give the entire project a coat of light stain. Apply a coat of shellac and sand lightly, repeat the last two operations and finish by applying a coat of wax.

This will show the boy at a glance the result of staining and finishing over:

1. Not sanding at all.
2. Sanding across the grain.
3. Leaving on the surface pencil marks and glue.

I have found this teaching aid very valuable and applicable. A short time spent with the boy in discussing this aid usually is sufficient to convince him that there is a proper way to finish a piece of wood or project in order to make a good looking job.



FOUR OF THE SCHOOL BOOTHS AT THE BOYS' ACHIEVEMENT WEEK EXHIBIT, CHICAGO, ILL.—MAY, 1926.

THE BOYS' ACHIEVEMENT EXPOSITION AT CHICAGO

Magnificent Showing of the Manual Training Department of the Chicago Elementary and Secondary Schools

From May 10th to 15th the manual arts department of the Chicago city schools gave the community an impressive demonstration of the variety and quality of work produced by boys in the upper grades of the elementary schools, in the junior high schools, and in a few of the senior high schools. The occasion was the Boys' Achievement Exposition, which is conducted annually by the federation of organizations interested in the betterment of boys and in the improvement of boys' life in the city. The Exposition was held on the Chicago Municipal Pier which juts out into Lake Michigan nearly a mile and which contains an exhibition floor about seventy feet wide and three-fourths of a mile long.

The manual arts department of the Chicago schools, which is directed by Mr. Edward F. Worst, offers various types of shop instruction in the sixth, seventh, and eighth grades to some 75,000 boys, in 250 elementary school shops presided over by approximately 300 teachers. Mr. Worst is also in charge of the shop work in eight junior high schools where some 30 shops are conducted by 32 teachers for the benefit of approximately 9,600 boys. The senior high schools, which are directed so far as their shop work is concerned by Mr. A. G. Bauersfeld, have some 350 shops in which some 16,000 boys are doing vocational and prevocational work.

An idea of the extent of the Boys' Achievement Exposition may be understood when it is said that the booths extended along both sides of the exhibition hall for a space of 1,800 feet or practically the length of five city blocks. The work shown was limited to one or two specimens of the regular shop work done in each of the elementary schools and junior high schools. Even with this limitation, it was necessary to eliminate some articles which were sent to be shown. In all, there were approximately 500 window boxes of various designs and more than a thousand bird houses. There were also large numbers of kites, radio receiving sets, model airplanes, model yachts, photographs, ship models, rope work and knots, sheet metal products, raffia and other woven baskets, specimens of printed work, garden trellises, woven furniture, concrete work, pottery, etc. It was quite remarkable that while woodworking was at one time the only shop activity in the Chicago grades, it has now become only one of the large number of activities indicated in the preceding list. The woodworking products included various household utilities, boy-interest articles, furniture, and a particularly meritorious and colorful showing of original toys. These toys varied from the simplest coping saw toys to interesting carts and wagons. In all, the 44 booths occupied by the schools presented some 50 to 100 pieces each, in addition to live working exhibits.

The entire showing was made possible through the splendid cooperation of the shop teachers who not only collected products of their shops, but also transported them to the Exposition and installed them. Each evening during the week of the Exposition there were live classes engaged in woodwork, raffia and cane weaving, printing, sheet metal work, weaving, electrical work, etc.

The local boys' clubs and other organizations interested in boy work also made exhibits, but these were decidedly limited as compared with the showing made by the schools. They included competitive exhibits and typical work from various settlement houses, boy scouts, and other religious and welfare groups.

DETROIT HOLDS MODEL AIRPLANE CONTEST

The development of shop work in elementary and secondary schools has given opportunities for motivation, interest, and cooperation with agencies outside the schools, such as none of the academic or book subjects have ever made possible. While essay contests have been frequent in such subjects as history and civics, it is doubtful if these have ever provided such interest and enthusiasm on the part of the boys and such aid from the community as have contests in bird house construction, model yacht building, and model airplane making.

The industrial arts department of the City of Detroit recently held a model airplane contest which aroused wide interest in the school shops and resulted during the month of April in the production of a large number of model airplanes in the seventh and eighth grades and in the high schools.

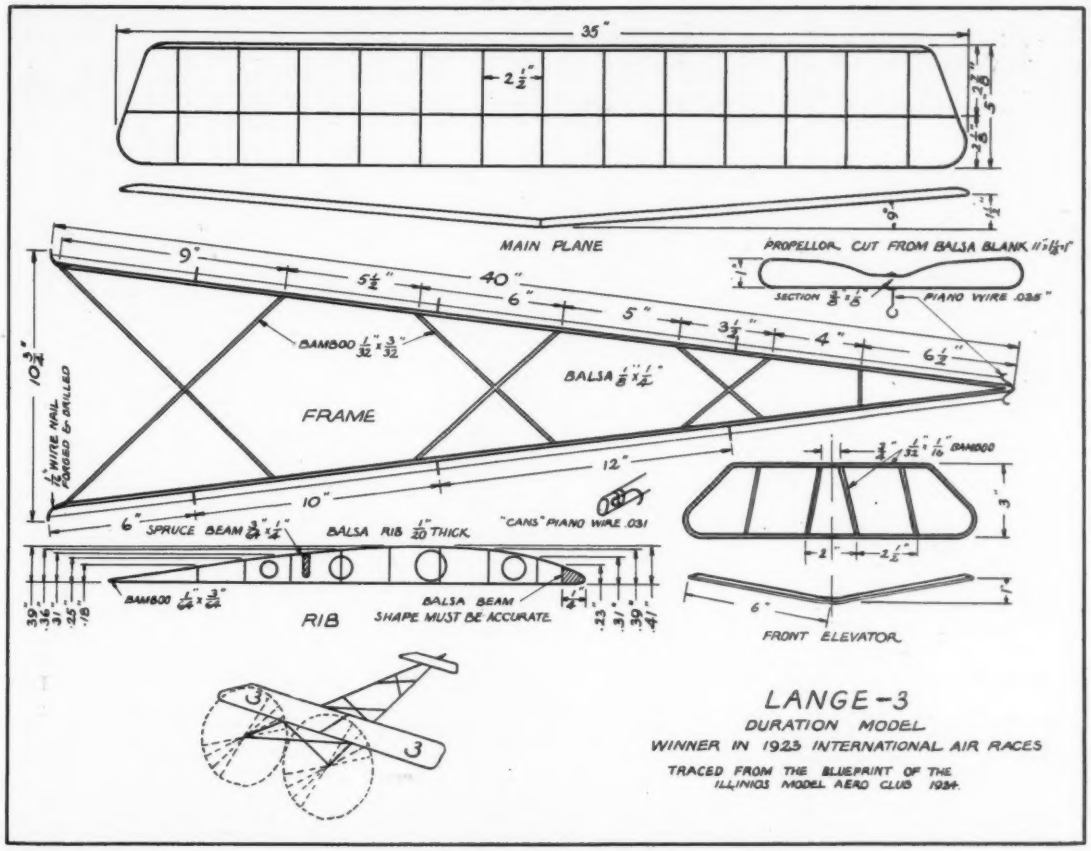
Two preliminary contests, in the east side and west side of the city, respectively, were held on May 6th for the purpose of eliminating all but a small number of the best models. The final trials, limited to 25 boys, were held on May 8th for the purpose of awarding local prizes and of selecting the twenty winners to represent the city in a contest with Chicago miniature air craft builders. Separate contests were conducted for the pusher and tractor types.

The Detroit Free Press cooperated in the work by distributing booklets to the schools containing detail drawings of model planes, specifications, lists of materials, and directions for building the flying model planes. The Detroit Flying Club and men of the local aviation industry cooperated with the "Sky Traffic Weekly," aviation section of the Free Press, in conducting and judging the contest.

The winner in the final contest, Jack Laughran, a student in the College evening high school, was awarded a silver trophy offered by Mr. Wm. B. Stout. The three best models flown were purchased by Mr. Stout for $25, $15, and $5, respectively. Junior memberships in the Detroit Flying Club and other prizes were awarded to the winners. Laughran's tractor model airplane remained in the air 115 seconds, and his pusher model was up 73.5 seconds.

The making of the models and the general management of the races were directed by Mr. M. W. Hamburg, instructor of manual training and director of airplane construction, assisted by the manual training teachers of the Detroit schools. Mr. J. H. Trybom, Mr. F. R. Kepler, and Mr. Earl L. Bedell took an active interest in the project.

"The high school boys of today are the designers of the airplanes of tomorrow," Mr. Alfred Verville of the Buhl-Verville Co., told the crowd of several hundred who attended the races. "Some of these boys, if they maintain the interest they are showing now in scientific design, will some day work out new ideas in the design of planes that will mark great development over what we now have."



DEATILS OF ONE OF THE TYPES OF PLANES BUILT IN DETROIT.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

END TABLE FOR JUNIOR HIGH CLASSES

Francis E. Joas, San Antonio, Texas

(See Supplement No. 25)

I am not entirely in sympathy with the idea of solely making things, as the proper policy to follow in junior school manual training work. It seemed to me that if we are to benefit the masses in which our training will function directly, we must teach the boys how to attack problems that confront daily the great masses of people.

I care not for whatever station or profession in life your boys will eventually find themselves, and I believe that after a consideration you will agree with me, that there is no one who cannot well afford to know how to drive a nail or a screw, how to repair a door lock or a leaking faucet, kitchen chair, a sticking door, how to do successfully the countless other repair and replacement jobs that arise about the household.

However at present our work is largely manufacturing, or better, making things, so I am herewith submitting a design and drawing of a davenport end table. This table is a real challenge to an upper junior high school boy, but with the enthusiasm that it should create, I have found that it is not beyond his ability.

This table should preferably be made of walnut, mahogany, gumwood, or birch. There is considerable curved sawing, so it is best made where a band saw is available. It is of simple mortise-and-tenon construction, the top being secured with four 1-inch angle irons, which are screwed to the inside of the ends, slightly lower than the top so as to draw the top down. The thickness of the top is false and made by gluing a 1-inch strip around the ends.

A simple design can be routed in the top and finished two-tone which greatly enhances the beauty. A good finish is essential. We use water stains of walnut and mahogany shades, finishing with two coats of pure orange shellac, rubbing the last coat with pumice stone and oil.

This table is representative of modern furniture found in our furniture stores, and will do credit to any junior school from which it comes.

Bill of Material

2 pieces ⅞"x6"x21¼"—Ends.
2 pieces 1½"x2½'x12"—Feet.
1 piece ⅞"x12"x26"—Top.
1 piece ¾"x2"x18½"—Rail.
2 pieces ⅝"x1"x26"—Edges of Top.
2 pieces ⅝"x1"x12"—Ends of Top.
4 1" Angle Irons.

A PERPETUAL CALENDAR

R. L. Hill, Saginaw, Mich.

(See Supplement No. 26)

How necessary it is that we have a calendar, and, yet a large calendar is too expensive to buy each year to be placed in each room and shop.

This simple calendar may be made at very little expense, and can be used year after year. Another pocket could be added, if desired, in which to place the days of the week.

Six cards are needed, on which are printed the twelve months; i.e., January and February are printed on opposite sides of one card, etc. Sixteen cards are needed, on which are printed the numbers 1 to 31; i.e., 1 and 2 are printed on opposite sides of one card, etc. A heavy grade of bristol board, that will take ink on both sides is desirable for these cards. The numerals and letters may be made solid or merely outlined, as illustrated. It is a good plan to give them a thin coat of white shellac, to preserve them, and make them easier to clean.

The depth and thickness of the two pockets will depend on the size of bristol board used. The dimensions given are those used by the designer. The numerals are of an excellent mechanical vertical Gothic style.

SPINET RADIO CABINET

R. O. Buck, Chicago, Ill.

(See Supplement No. 27)

The spinet desk is deservedly one of the most popular antique furniture reproductions, because of its beauty of line, simplicity and convenient arrangement. The design is adaptable as a radio cabinet as the pigeon hole space is adequate for the average receiving set and the spaces at each side house the "B" batteries and dry cells for "A" batteries easily, leaving the writing bed free for phones, speaker, and log. When the lid is closed all but the speaker can be concealed.

Though it is possible to mount a five tube neutrodyne on a seven by twenty-four panel, it is not advisable because of the danger of leaking between parts, making the set inefficient. Any of the three or four tube sets will mount on this size panel nicely, however, and are more suitable for dry cell operation.

The construction of this project is comparatively simple and should not prove too difficult for an advanced student. The back, front and side panels should be framed up complete with the partitions in place to hold the short front panels in place. The bottom is screwed on the lower edges with its edges flush with the outer edges of the sides and ends. The mouldings cover and finish these edges.

In order to give sufficient strength to the corners where the legs are dowelled, a double bottom is placed in each of the battery compartments, which also serves as a cleat to stiffen the bottom.

The corner joints should be dowelled and glued and also reenforced with triangular corner blocks as shown on the detail. If the quarter-round corner is too difficult for the student to joint, a square post will be satisfactory.

The lid moulding can be formed with a universal plant if available, or a simple beveled edge used effectively. Piano hinges add to the attractiveness but are not essential.

In turning up the legs it is advisable to make a templet of thin wood or metal so that the four legs will be alike. A strip of wood through which short brads are driven at intervals corresponding to the design will be found convenient for spacing off the stock after it has been turned round.

Bill of Materials for Spinet Radio Cabinet

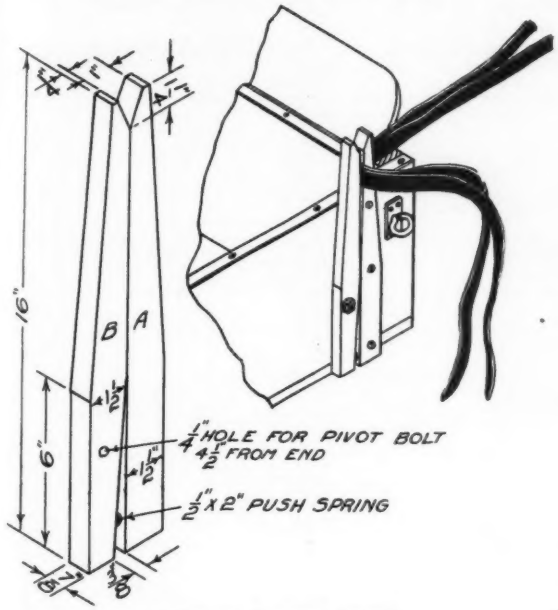
2—Top pieces	¾"x10¾"x3' 3½"	Formed on 3 edges
1—Front lid	¾"x10¾"x2' 0 "	
1—Back panel	¾"x 7⅞"x3' 0¼"	
2—End panels	¾"x 7⅞"x1' 6⅜"	
2—Front panels	¾"x 7⅞"x 6⅛"	
2—Raised panels	⅛"x 3 "x 4 "	Formed edges
2—Partitions	¾"x 7¾"x1' 6⅜"	
2—Sliding lids	⅜"x 5¾"x 10½"	
1—Base board	¾"x11¼"x1' 6⅜"	
1—Bottom	¾"x20 "x3' 2 "	
2—Cleat bottoms	⅞"x 5¼"x1' 6⅜"	
4—Corner blocks	⅞"x ⅞"x 7⅜"	Formed
8—Triangular corner blocks	¾"x ¾"x 6⅜"	
2—Pieces base moulding	½"x ¾"x3' 3½"	Mitered
2—Pieces base moulding	½"x ¾"x1' 9½"	Mitered
2—Panel cleats	¾"x ¾"x 7 "	Formed as shown
4—Turned legs	3 "x 3 "x2' 5⅝"	(1¾"x⅞" dowell)
1—Strip	¾"x ¾"x2' 0¾"	Glue to edge of base board

REIN HOLDER

Louis M. Roehl, Ithaca, N. Y.

The rein holder is a device to be fastened to the front corner of a wagon box to hold the reins while the driver is otherwise employed.

The holder consists of two pieces of hardwood ⅞"x-1½"x16", a ¼"x2½" carriage bolt, three flat head wood screws, 1½" No. 9, and a ½"x2" push spring.



DETAILS OF REIN HOLDER.

The pieces of wood are cut to the dimensions shown in the drawing. A 9/16" hole is bored ¾" deep on the inside edge of each piece, at a point ¾" from the bottom end for the spring to fit in. The piece marked A is fastened to the box with the three screws. The piece marked B is then placed against the piece marked A, and is fastened to the box with the ¼" bolt. The bolt acts as a pivot and allows the top of piece B to be moved away from A against the pressure of the spring. The chamfered opening at the top of the holder makes it easy to slip the reins between the pieces and the spring holds them like a clamp.

THE MARTHA WASHINGTON SEWING CABINET

Alan H. Nicol and Anton Anderson, Buffalo, N. Y.

The Martha Washington Sewing Cabinet reflects the simplicity and stability of the New England colonial people, in contrast with the characteristics which are embodied in the "Priscilla Alden Sewing Cabinet" which was shown in the April issue; and this in spite of the fact that Priscilla Alden was a typical New England Puritan maiden and Martha Washington a representative of the Virginian people. While the latter type of cabinet was designed primarily to be carried from the house onto the piazza and into the garden, the former was made to be used as a household convenience alone, for it lends itself to any interior arrangement. Investigation has failed to reveal the originator of the design or how it acquired the name which has proved to be so appropriate, but one authority has stated that the type was typical of the Duncan Phyfe creations and that it appeared after the year 1800.

A cabinet of this type makes it possible for the housewife to keep all of her sewing paraphernalia together, systematically arranged. All available space can be utilized to advantage. Much space for the larger pieces of work is provided in the end cabinets which are readily accessible through the upper hinged lids. The middle compartment consists of a set of three drawers of different dimensions. The upper one has a sliding tray divided into five compartments, which provide ample space for the numerous smaller articles used in needlework. The second or middle drawer is equipped with two one-quarter inch steel rods to be used as spool holders. The convenience in the use of the thread resulting from the orderly arrangement is a feature which is especially attractive to all students of domestic art. The lower drawer is larger than either of the other two. Drawer space of this type is always appreciated.

The Martha Washington Sewing Cabinet is usually made of mahogany, but it may well be made of any soft wood which will take a finish to harmonize with the type of household furniture purchased today.

The full size detail drawing is again an essential to proper construction. Especially is it needed in the layout of the end cabinets where the angular work must be perfect. Directions for the development of the drawing may be obtained by referring to the article on the "Queen Anne Type of Chest" which appeared in the April issue.

In the accompanying drawing, half of the front view is shown and to the left of it is a sectional view which gives all measurements necessary to the interpretation of the front view. The top view or plan is laid directly into the front view. It gives the accurate dimensions of the drawer stock and end cabinets, as well as the type of construction employed in the making of these.

As has been stated heretofore, this view for practical purposes, should always be drawn in red to make it clearer and the interpretation easier for beginners. The full end view, which is usually included in a full size drawing, is not used in this case because it would be of no practical value to the worker. The front view and the plan give all the information necessary to a successful completion of the project.

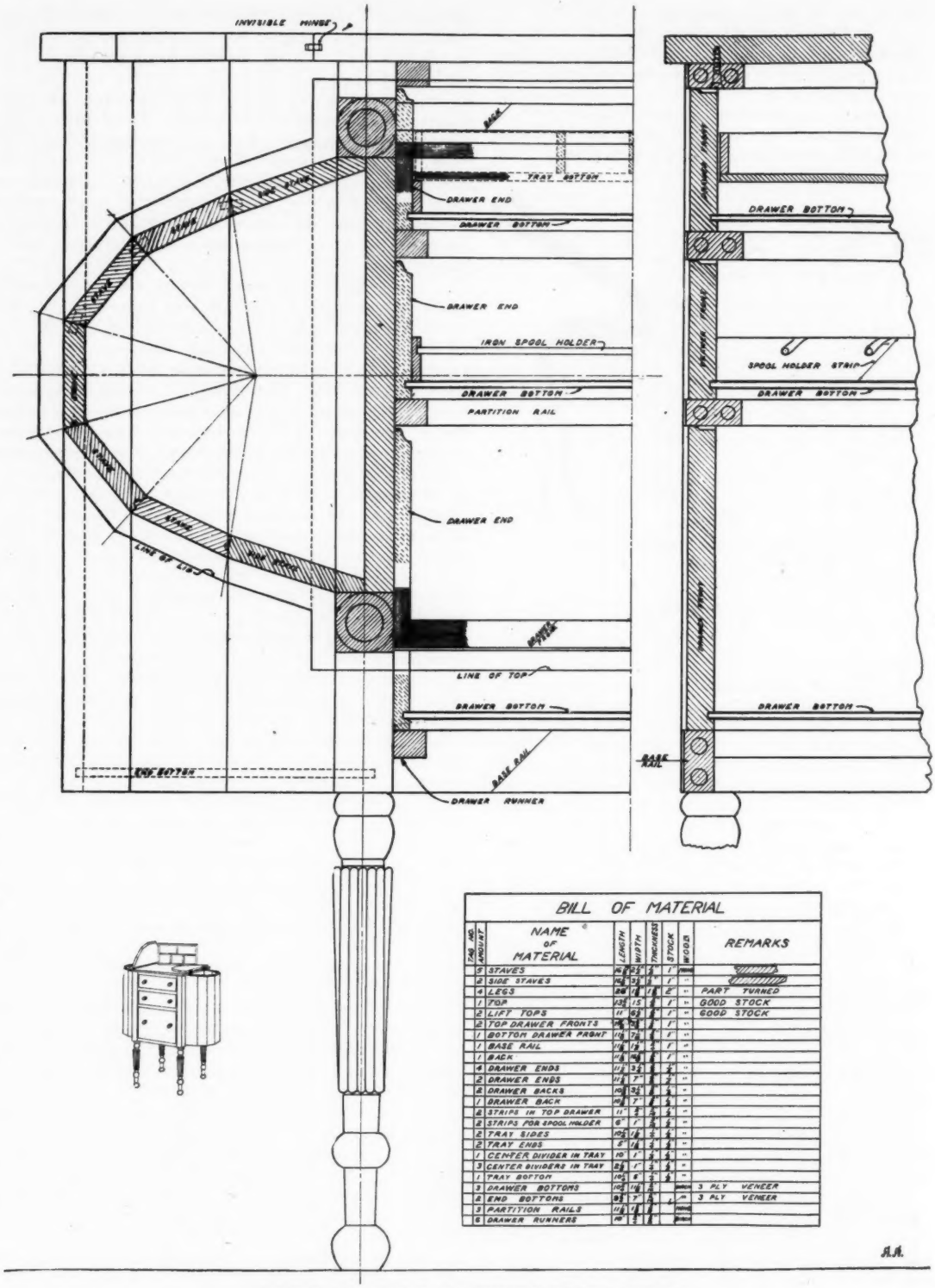
Two methods of construction are shown for making the staves of the end cabinets. The one which can be made most readily with the shop facilities available should be used. They are the slip-tongue and groove and the stationary type of tongue and groove. The slip-tongue and groove joint can readily be completed with the aid of a universal saw table, while the other necessitates the use of a shaper or stirker. The staves must be well jointed, the bevels straight and exact—in fact, they must be flawless.

The lids are usually hinged with invisible butts. This makes a much neater appearance than when the visible, open butts are used. It will also be noticed that the butt-and-dowel joint construction is used throughout. The legs are beaded to conform with the spirit of the time, but the beauty of the cabinet will not be greatly impaired if this is not done.

The accompanying bill of material which gives the net sizes, includes all the pieces necessary to construct the cabinet. This will prove helpful to the worker in the interpretation of the drawing, getting out the stock, and also in the making of the cabinet.

In the construction of the end cabinets, either three or five pieces may be substituted for the seven staves shown in the drawing. If this change is made, it will necessitate a change in the layout on paper to conform with it. The use of a less number of staves naturally makes the construction easier, but it does not eliminate the need for accuracy and care so essential to success.

The proper procedure to be followed in building up the end cabinets is as follows: The interior ends and two legs should be glued together first. The staves when put



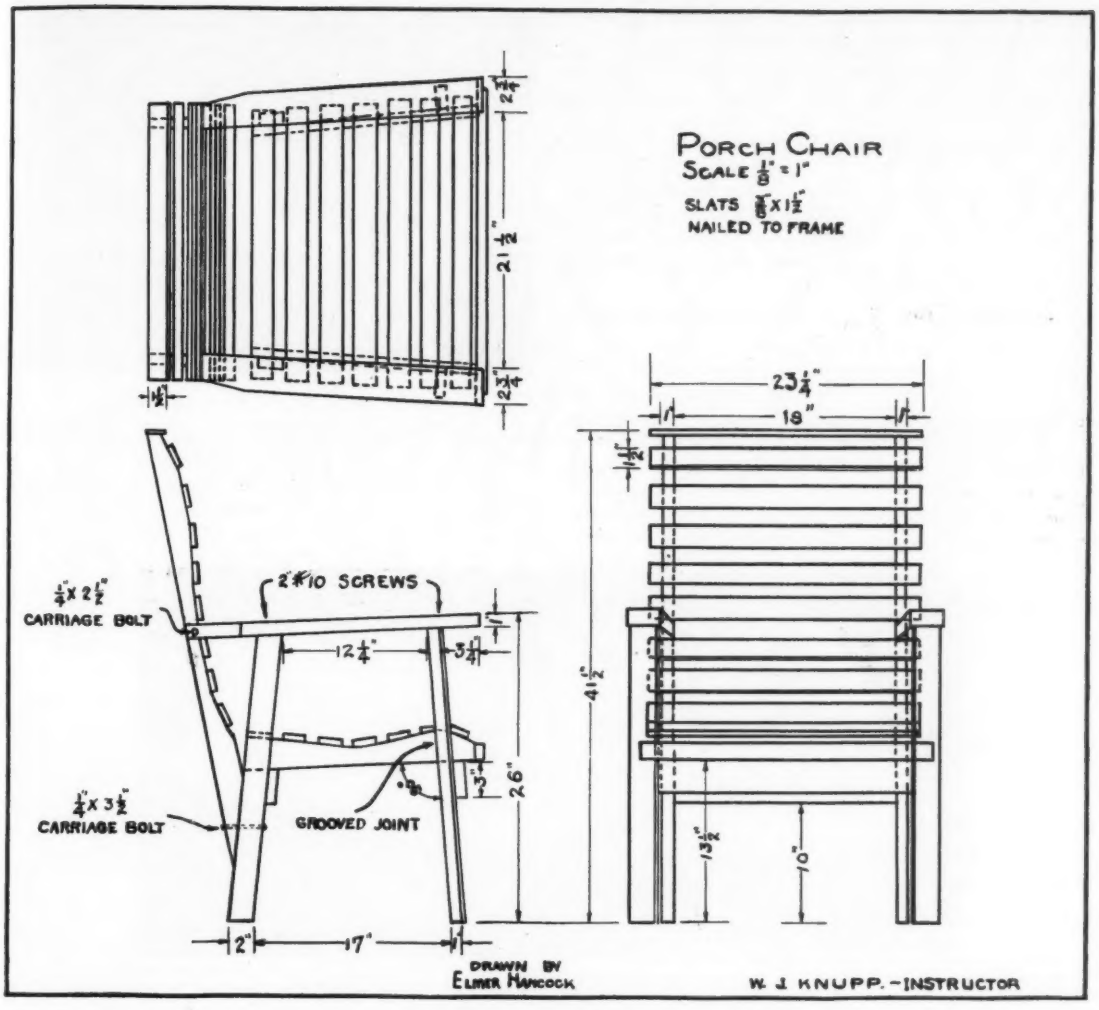
BILL OF MATERIAL

CHECK NO.	AMOUNT	NAME OF MATERIAL	LENGTH	WIDTH	THICKNESS	STOCK	WOOD	REMARKS
	5	STAVES	40	2½	⅞	1		
	2	SIDE STAVES	40	3½	⅞	1	"	
	4	LEGS	28	4	4	2	"	PART TURNED
	1	TOP	43½	15	¾	1	"	GOOD STOCK
	2	LIFT TOPS	11	6½	¾	1	"	GOOD STOCK
	2	TOP DRAWER FRONTS	14	5½	¾	1	"	
	1	BOTTOM DRAWER FRONT	11½	7½	¾	1	"	
	1	BASE RAIL	11½	3	¾	1	"	
	1	BACK	11½	40	¾	1	"	
	4	DRAWER ENDS	11½	3½	½	½	"	
	2	DRAWER ENDS	11½	7"	½	½	"	
	8	DRAWER BACKS	10	3½	½	½	"	
	1	DRAWER BACK	10	7"	½	½	"	
	8	STRIPS IN TOP DRAWER	11"	½	½	½	"	
	2	STRIPS FOR SPOOL HOLDER	6"	1"	½	½	"	
	2	TRAY SIDES	10½	1½	½	½	"	
	2	TRAY ENDS	8"	1½	½	½	"	
	1	CENTER DIVIDER IN TRAY	10"	1"	½	½	"	
	3	CENTER DIVIDERS IN TRAY	8½	1"	½	½	"	
	1	TRAY BOTTOM	10½	8"	½	½	"	
	3	DRAWER BOTTOMS	10½	11½	¼		PLYWOOD	3 PLY VENEER
	2	END BOTTOMS	9½	7"	¼		"	3 PLY VENEER
	3	PARTITION RAILS	11½	1"	¾		PINE	
	6	DRAWER RUNNERS	10"	½	¾		"	

A.A.

DETAILS OF MARTHA WASHINGTON SEWING CABINET.

together should fit the other contour of the cabinet layout. Two forms may be made from two inch cull stock to fit this same layout. One of these is used on the top and the other is used at the bottom. They should be long enough to extend beyond the staves to the outside of the legs so that iron bar clamps or handscrews may readily be applied. The bottom is inserted in the dado cuts made for it, when the final assembling is being done. It is well to use nails or screws in addition to gluing the two larger staves to the inner end panel and legs. These ends may also be fastened together with the aid of ropes and twist or column chain clamps, but the first method will undoubtedly prove to be the one most readily adaptable to school usage. In using the wood forms one avoids



DETAILS OF PORCH CHAIR.

marring the ends. They are, also, more accurate and much easier to use than the other appliances mentioned, and the forms once made may always be retained for future use.

The only trimmings needed are the slides for the bottoms of the legs and two pairs of invisible hinges. The drawer pulls are preferably of the material from which the cabinet is made. These may readily be turned up on a lathe by the student.

PORCH CHAIR

W. J. Knupp, West Junior High School, Sioux City, Iowa.

This period of the year turns our thoughts to projects used out of doors, as lawn furniture, bird houses, and bird baths.

The problem represented is not beyond the ability of the eighth or ninth grade student and appeals to the average boy as a live problem. The slats for the seat and back are made from ¾" material re-sawed. The project may be made from any soft wood if the article is to be painted, but oak is preferred by the majority of pupils.

HOW WE USE VOCATIONAL INFORMATION

W. W. Borden, Supt., South Bend, Ind.

Vocational guidance has been considered by the casual observer as something relating principally to the placement of pupils in suitable employment, and of giving advice to pupils who plan to leave school. But it means much more than placement—it is vitally important for all pupils in our educational system, whether planning immediate or ultimate participation in the world's work.

Feeling the need of vocational information and educational guidance as a part of our work, we established in our school system five years ago a department known as Vocational Guidance and Information. The personnel of the department consists of the director, an assistant who has charge of placement, and a clerk. In each of our four junior high schools we have advisers or counselors who are responsible to the director for the work in each school.

The courses in Occupational Information are planned as a part of the regular curriculum of the Junior High Schools. These courses, which form a part of the work of the social science group, are given the following amount of time: seventh grade, one period a week; eighth grade, two and one-half periods a week; ninth grade, one period a week. At the present time a special committee is working out a plan for continuing throughout the Senior High School all the phases of guidance begun in the Junior High School.

In order to carry out successfully the aims of the course, the subject-matter is planned to include: (1) educational opportunities; (2) field of occupation; (3) occupational problems; (4) vocational ethics and character development.

There is no time more favorable than the junior high school age for stressing character building. The importance of character education must be placed on a par with other types of education. While character education permeates all subjects and all pupil activities, it cannot be left to chance, but must have a definite time and place on the school program.

MODEL SHIP BUILDING IN A SUMMER CAMP

Ernest W. Tuttle, East Orange, N. J.

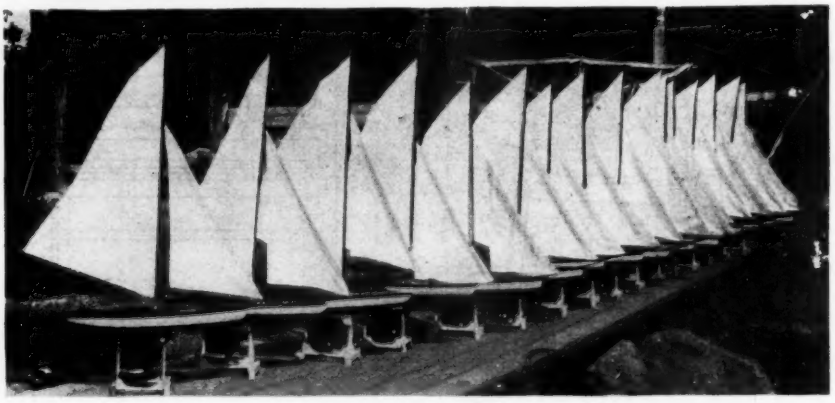
The work of man's hand is a foundation upon which, as the adolescent mind develops, a sound comprehensive mental structure is in good part built. Lawyers, statesmen, writers, and business men are something less than real when they are in touch only with their own kind and know the working materials of only their own kind. Over the door of our camp shop, one might appropriately inscribe two significant words from Horace—"Integer Vitae," meaning wholeness, symmetry, and soundness of life; therefore, poise and strength.

A brief description of shop and shopman as found in Camp X, may prove interesting:

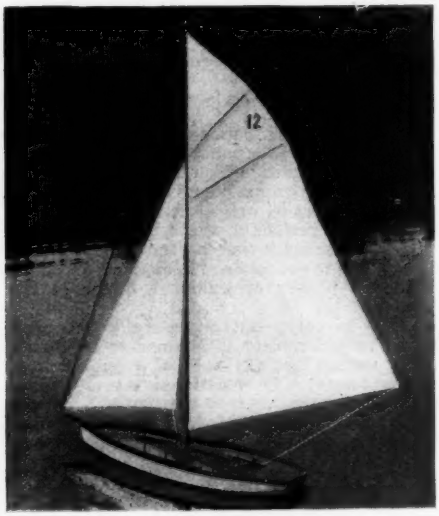
The shop is on the second floor of a boat-house, which, hemmed in on the rear by towering pines, opens on the front to a sheet of crystal water and a range of mountain peaks. Over the walls of the shop are maps, blueprints of locomotives and cars, large colored posters of steamers and sailing vessels, old models of all sorts but especially of ships, with innumerable samples of the work of youngsters past and present. A well-organized tool room occupies one corner. There are benches around the sides, a band saw, and other machines. Fresh, pungent shavings cover the floor each working day. In some happy time, an enlightened camp director added a great fireplace fronted with a clay head of Simba. A potter's wheel and kiln are in a corner, where boys with impulses toward pots, tiles and glazes may express themselves.

BOYS AT WORK IN THE CAMP SHOP.

Consider, for a moment, the business of making ships. If you can get a feeling for ships into your boys, what do you get with it? Many things, of course, but primarily an appreciation of the beauty of economized strength. Nothing about a ship exists without the justification of necessity; there is no detail of construction but comprises required strength in the smallest possible dimensions. No technique is so organic, so moulded by nature's forces, as the technique of ship building. The result is the most beautiful product man has ever made.



SOME OF THE YACHTS READY FOR THE ANNUAL REGATTA.



LAST YEAR'S PRIZE WINNER.

The business of model ship building in the camp is by far the outstanding project of the occasion. What boy can handle or gaze upon a beautifully finished model of a sail boat, fully rigged and ready to sail, without feeling a great desire to build one for himself?

Before we proceed further, let us study for a moment the shop man. The shop standards of craftsmanship are high. They must not only be done well in camp, but they must be done very well. There is no room for carelessness and tag-ends; happiness is found only in the accomplishment of a high standard. Therefore, we dare to say that there is only one kind of person really eligible as a teacher of camp shop—an artist whose province is the art of teaching.

Now let us proceed upon the detailed preparations previous to the actual beginning of instruction. After a modern type of sail boat has been selected, it is necessary first of all to build a model and tabulate the various steps of operation in their proper sequence. A detail and assembly drawing full size is very helpful, and should be printed in sufficient quantity to allow one print for every

A USEFUL AND INTERESTING ALPHABET DESIGNED BY W. BEN HUNT AND ED HUNT.

two boys. In order successfully to accomplish this boat building project in the short camp season, it becomes necessary to thoroughly analyze the situation, ever keeping in the foreground the necessity of jigs and labor saving devices, thus bridging the pitfalls of discouragement by simplifying the operations to a minimum.

The finishing touches of paint, varnish, and rigging should be applied to the model by the instructor in the presence of the class. Here at the finish comes a great opportunity for greatly needed assistance.

Finally comes the much talked about sailing regatta, and of all competitive sports in camp this is the foremost. The races are well planned, and the boats are numbered in the order of their completion. The entire camp and many visitors are lined up on shore as the greatest event of the season takes place. Two beautifully engraved cups are awarded, one for the greatest number of points won in the regatta and the other for the best shop spirit and progress.

INDUSTRIAL ARTS VOCABULARY

F. S. Crispin, Philadelphia, Pa.

Drawing of Temper—The heating of steel to red heat and allowing it to cool slowly in the air. The reverse of hardening or tempering.

Drilled Holes—Holes are drilled in all high grade work in preference to being cast.

Drilling Jig—A device of cast or wrought iron which becomes a guide for the drilling of holes. The work is fastened in the jig and the drill is guided in its movements through holes drilled in the face of the jig itself.

Drill Socket—The socket which receives the shank of a drill, either on the lower end of the drilling spindle of a machine, or in the drill chuck of a lathe. Same as plain collet.

Drill Spindle—The vertical spindle of a drilling machine, which carries the drill, and revolves; and through whose vertical movement the feed is operated.

Driven—The wheel, wheels, or pulleys actuated by a driver.

Driver—The wheel or pulley from which power is transmitted to the driven.

Driving Fit—One in which the blows of a hammer are required to accomplish the desired result as in fitting a bushing to a hole.

Drop Forging—Forgings that are formed in dies under a drop hammer.

Dry Wood—Timber from which the sap has been removed by seasoning.

Ductile—Capable of being drawn out as into wire or into threads.

Ductility—That property of metals by virtue of which they can be drawn out into wires.

Dynamic Load—A rolling or moving load as distinguished from a dead load.

Dynamics—That branch of mechanics which treats of the laws of forces that produce motion in the bodies and structures upon which they act.

Dynamo — An electrical machine for converting mechanical into electrical energy.

Dynamometer—A machine or mechanical contrivance for measuring power; as the horse power generated by a motor or engine.

Elastic Strength—The greatest stress a bar or structure is capable of sustaining within the elastic limit.

Electrolysis—Decomposition of a material by an electric current.

Eliminating—The act of getting rid of—casting out. Setting aside as unimportant or inapplicable.

Emery—A species of corundum composed of oxide of iron, alumina, silica, and a small portion of lime. Used as an abrasive.

Empirical Rule—Any rule or equation which is not deduced from purely mathematical or physical considerations, but which is based upon experience, convenience or custom. Empirical formulas are freely used in engineering practice.

ANNOUNCE PROGRAM OF VOCATIONAL AND PRACTICAL ARTS DEPARTMENT

Announcement has been made of the completion of the program for the Department of Vocational Education and Practical Arts of the National Education Association, to be held June 29th to July 1st, at Philadelphia, Pa. The sessions will be held ni the auditorium of the Spring Garden Institute.

The first session will be in charge of Mr. Charles F. Bauder, director of industrial arts of Philadelphia. At this meeting, Miss Isabelle C. Bacon, special agent of retail store training, will discuss "Retail Store Training in Paris;" Mr. F. Theodore Struck, director of vocational education, Harrisburg, Pa., will talk on "New Developments in Industrial Arts Education," and Mr. Frederick Horridge, of the department of vocational education, Ohio University, will give a talk on "A State Plan for the Training of Trade Teachers."

At the second session, Mr. Howard L. Briggs, director of vocational education at Cleveland, O., will be in charge. Miss Ruth Sill, principal of the girls' trade school, Philadelphia, Pa., will talk on the topic, "What Can a Girls' Trade School Do for Girls and Women in Industry?"; Mr. R. F. Carey, supervisor of education at the Westinghouse Electric Co., Lester, Pa., will discuss "Apprentice Training in the Metal Trades;" Miss Adele Rudolph, supervisor of elementary industrial arts, Philadelphia, Pa., will talk on "The Function of Industrial Arts in the Early Grades," and Mr. G. A. McGarvey, agent in industrial education for the Federal Board for Vocational Education, Washington, D. C., will give a talk on "Present Tendencies in Industrial Education."

THE VOCATIONAL EDUCATION SOCIETY OF BOSTON HAS AN EXCURSION AND ITS ANNUAL MEETING

The May meeting of the Boston Vocational Education Society was held May 8 at the Shirley Industrial School. This school is a state institution under the Department of Public Welfare, and is situated about forty miles from Boston, a short distance off the Mohawk Trail. The day proved an ideal one for an outing, and about 65 members reported present to make the trip by automobile.

Much of the forenoon as remained after arrival was devoted to an inspection of the grounds, buildings, and shops, under the guidance of Assistant Superintendent Farnham. Most of the numerous impressive buildings were constructed by the labor of the inmates, under the direction of trade instructors. The plant has a wonderful location on a spacious hillside, and consists of dormitories, a gymnasium with swimming pool, a hospital and other features which might well make it the envy of many an expensive boarding school. The buildings are of thoroughly modern, fireproof, sanitary construction.

The Shirley Industrial School does little teaching of an academic nature; its chief aim is to prepare boys for self-support by giving them strictly vocational training adapted to their respective capacities and needs. A large dairy farm, operated by the boys, furnishes three hundred quarts of milk daily for consumption in the institution. Lumbering operations are carried on on the school's own property. Gardening and general farming constitute a large feature of the school's life. The institution is really a self-contained society, in which all the work is performed by members. The janitor work, cooking, laundry work, and housekeeping are tasks allotted to boys. In addition to building construction and the other employments already mentioned, tailoring, machining, forge work, and cabinetmaking are carried on in shops devoted to these purposes. The boys seem to thrive in the surroundings and under the treatment which they receive. A healthier lot of youngsters it would be hard to find.

At one o'clock dinner was served in the clubhouse reserved for officers and members of the staff. At the conclusion of the meal, the meeting was called to order and opened for business by President Robert H. Baker.

Ten new members were voted into the society. They were: Gordon B. Chapman, Elmer Damon, Carl E. Taylor, Frank A. Hurley, Benjamin F. Kingham, James B. Cummings, George E. MacLean, Jr., Harold H. Coburn, Karl A. Gunderson and Robert S. Waite.

Mr. George M. Morris, delegated by the nominating committee, spoke in warm commendation of the work of the retiring officers, and presented their names for reelection. No additional nominations were made from the floor, and it was voted unanimously to instruct the secretary to cast a single ballot in accordance with the committee's recommendation. The reelected officers are: President, Robert E. Baker of Boston Trade School; Vice-President, Ralph E. Babb, Director of Lynn Continuation School; Secretary, Emerson Staebner of Sherwin School, Boston; Treasurer, Leroy M. Twichell, Director of Malden Continuation School; Librarian, Fred M. Chandler of Salem High School.

President Baker made a brief speech of acceptance for himself and his brother officers, and then after some announcements regarding the sports which would follow the meeting, introduced as speaker the host of the occasion, Superintendent George P. Campbell of Shirley Industrial School.

Mr. Campbell began his talk with a consideration of the statement so often heard, that "it is impossible to give a good course of training, and have production at the same time." At Shirley, he said, the untruth of this statement has been proved from the beginning. Every bit of the work done by the boys is of a productive nature; in fact, the production need is the determining factor in the vocational courses offered. The school's effort is directed first, towards teaching the boys to do things; next, to give them such trade knowledge as is involved in the doing of them. A boy may not, in his experience at Shirley, touch every boundary of the trade in which he works; but what vocational school boy does?

The Shirley youngster at least gets a proper perspective on production, on labor; a perspective which should help him to find and to appreciate his place in the outer world. He works eight hours a day; industry and sustained effort are vital parts of the system, not mere virtues to be lectured about in classrooms. The pupil does not stroll in for a two-hour period, spend fifteen minutes in getting to work and another quarter hour in leisurely preparation for quitting, and employ the intervening period in a half-hearted attempt to absorb skill and knowledge without sweat. He really gets the flavor of a day's work, and hard work at that: a flavor which is more of a vocational asset than any amount of technical knowledge from which it is absent.

Mr. Campbell was very frank in criticism of public efforts towards vocational education which had come within his notice. He quoted a school superintendent's expressed opinion on a proposed raising of the school age which would bring back boys who had gone out into industry: "These boys would find no attraction in our schools: they are geared up beyond our speed and our methods." This, urged Mr. Campbell, is a severe indictment of school methods, if true. He sent his own instructors on visits to a number of New England trade schools, and they reported back that Shirley boys acquire as much real trade skill in a few months as some other schools impart in a three-year course. To be sure, the Industrial School students do not get the vast range of technical information, the estimating, the planning and plan reading which we are likely to consider the necessary concomitants of any trade. But are these things in fact necessary? Are they necessary for all pupils? Are we choking in the grip of the traditional "higher education" theory, so that we want to make technicians instead of tradesmen, and foremen and superintendents rather than journeymen and helpers? Are we not discouraging the very boys whom we ought to serve? Are we emphasizing the white collar instead of the sweated neckband as the means to a livelihood, even in the mechanical trades? Are we disguising the flavor of work with condiments in which is no nourishment?

Vocational training is closely involved with character building, which is Shirley's chief interest. Fifty per cent of the inmates, estimated Mr. Campbell, are in the institution because of unwise education in the public schools. These schools, in attempting to put all pupils through the same set course, bear very hard upon those whom the course does not fit. Nearly all the boys committed to Shirley are sixth grade graduates; yet many of them are unable to do sixth grade work. This is not an indication that their usefulness is circumscribed: they may be thoroughly able to earn a good living at some skilled craft. It is an indication, however, that they have been given the wrong prescription. Such boys in public school, unable to do the work asked of them and keenly conscious of that inability, become truants, acquire a "laissez-faire" attitude. They adopt the habit of mind that they are beaten before they start; that idea spreads itself even into sports and other fields where there is no excuse for it. The are "quitters." How many boys in Masachusetts are there who are being "educated" into this frame of mind, but who through circumstance do not run afoul of the law and are not sent to Shirley?

Dr. Fernald has likened the body of knowledge to a rectangular building, several stories in height, with windows on all sides. The child in school is like a person on a ladder. He climbs to the first-story window and looks in, familiarizing himself with one room. He then climbs higher, to story after story. There are many, however, who reach the end of their individual ladders before they gain the top floor. The duty of public education is obvious. Even the shortest ladder can be transferred to other sides of the building, and give access to other windows on levels no higher than those first attempted. A child of fifth grade mentality can be given profitable education certainly up to the age of sixteen.

But he cannot be given such education by predetermining a course without reference to his individual needs. Vocational education is in the front rank when it comes to breaking down scholastic traditions. But even vocational education must make definite effort to avoid the pitfalls which are set for it. It must shun the idea that its task is to make executives and technicians of all its pupils. It must realize that there are also the grades of journeyman, helper, and "lumper" or rough worker. It must give to each boy a course leading to the type of work for which he is fitted; and it should see that each boy finishes that course. This is far better than to encourage boys to start courses to which they are not adapted, and then to drop them by the wayside carrying the stigma of the beaten.

Mr. Campbell concluded his talk with a few facts about the Shirley Industrial School. All boys committed to it are between the ages of 15 and 18. Commitment is for the period of minority; but the actual stay at the

school averages ten months only. The policy is to return the boy to outside life, under supervision, whenever such a course promises good results. The entire aim of the institution is reform, not punishment. Naturally, some boys after being sent out, are brought back. Of all those committed to the institution, experience makes it possible to prophesy that seven out of ten will prove to be permanently reformed, and that one out of ten will end in some penal institution. Successful efforts have been made to overcome any stigma which might attach to graduates of the school. An alumni association is flourishing, and holds meetings in Boston and elsewhere. Many former pupils of the school return to visit it in the course of a year, and are made welcome.

The Society voted its thanks and appreciation to Mr. Campbell and his staff, with particular mention of the ladies who served the dinner. In the afternoon the members repaired to the athletic field, where a baseball game was in progress between the Industrial School and a visiting team. Contests of an athletic and humorous nature were arranged, including a clothes-pin relay race and a tilting contest. Officials for the games were appointed, ranging from Starter to Stopper. They wore large metal badges for identification, and performed their duties in a very efficient, not to say officious, manner. A general conspiracy in which the weather played a part made this one of the most successful outings ever held by the Society.

THE SCHOOL CRAFTS CLUB'S ANNUAL BANQUET

Big Turnout to Hear Edwin A. Lee

This meeting of the School Crafts Club took place on Saturday evening, May 15, at Café Geneva, 143 West 44th St., New York City.

Three men were proposed and accepted as members: Mr. Peter Krassner, Brooklyn, N. Y.; Mr. Fred Bown, New York City; and Mr. Leo J. McAlery, Hoboken, N. J.

Eight concerns sent compliments in the form of souvenirs. There were lettering pens from Esterbrook Steel Pen Co.; individual fountain pens from Yates-American Machine Co.; individual silver steel compass saws from E. C. Atkins & Co.; crayons from Binney & Smith Co.; job sheets from S. C. Johnson & Son; and pencil clips from L. S. Starrett Co.

Joseph Fries of the Bronx won a 28-inch "Victory" cross-cut saw from Henry Disston & Sons; while Clinton W. Claus, of East Orange, was the lucky winner of a Stanley jack plane presented by the Stanley Rule and Level Co.

Mr. Edwin A. Lee, assistant professor and director of Vocational Education, University of California, feeling in a serious mood chose for his topic, "A Sermon on Vocational Education." Mr. Lee is the first president of the American Vocational Association, which was formed by the amalgamation of the Vocational Education Association of the Middle West and the National Society for Vocational Education. Following true homiletical style, Mr. Lee had a scripture reading, a text, ten commandments, and creed. His scripture reading was from the 29th Chapter of Ecclesiasticus, a book of the Apochrypha, and his text the 31st verse, reading: "All these trust to their hands and every one is wise in his work. Without these cannot a city be inhabited."

Every man should be independent and carry his own weight socially, economically, and ethically. Every man must work for his soul's salvation, and should have love for his work. Work and marriage have similarity. Mr. Lee can imagine only one thing worse than a man hating his work; which is to work all day at a trade he hates and then come home at night to a woman he hates. Every man should appreciate the inherent dignity of work. Years ago in New York City, Commissioner Waring was not satisfied with the morale of his street cleaners. He made them feel that their job did amount to something and had them dress in a white uniform. Thus was originated the "White Wings of New York." Work makes possible a great many things. Because somebody worked we have all the best things of life: food, shelter, clothing, and luxuries.

Mr. Lee suggests ten laws for industrial teachers:

1. Love your work with all your heart, mind, and strength.
2. Do not bow down to any brazen images in education (such as formal discipline).
3. Honor the father and mother of our present scheme of vocational education—manual training.
4. Do not bear false witness against your colleagues, the academic teachers.
5. Do not kill the spirit of youth as a sacrifice to the wheels of industry.
6. Do not steal boys to fill up the shops.
7. Do not forget that you are one of a team and should look to the principal for leadership. Participate in school affairs. Coöperate.
8. Do not covet your fellow teacher's position, salary, prestige, or power. These come to him who possesses knowledge.
9. Study diligently with understanding.
10. Remember the Sabbath to keep it holy. Stand for righteousness in your community. Be a good example to the boys.

Extemporaneous remarks were heard from past presidents of the School Crafts Club: John J. Hatch, Martin J. Corcoran, Edwin F. Judd, Philip M. Wagner, Richard A. Beyer, and Fred C. Arnold. A letter was read from William Noyes. Mr. John Mulholland, an accomplished magician as well as an industrial arts teacher entertained the men with his prowess in picking coins from the air, etc. Mr. Mulholland has just returned to America after a three-year tour in which he visited 26 countries, representing Columbia University in research on dramatics and industrial art.

The one hundred and fifty members present were presided over by Mr. Charles H. Kennington, Newark, N. J., club president. The next meeting comes on the third Saturday in October, when new officers are voted upon.

THE CHICAGO INDUSTRIAL ARTS ROUND TABLE

The final meeting of the Industrial Arts Round Table of Chicago, on May 7, resembled a dinner club more than a round table when Mr. Hanna introduced Mr. F. M. Pepper, Illinois Bell Telephone Co., Joliet, as chairman of the meeting.

"Where to find work" is the main objective of the high school graduate as well as the college man about this time of year, said Mr. Pepper, in picturing the clash of practical and working ideals vs. the theories young men often hold. There is a real knowledge which is possible for a young man to observe and practice, but often what young men know is only ideal and does not include the most valuable point of view which any applicant for employment must realize—that of beginning at the bottom.

The personnel departments in our modern high schools are doing much to acquaint boys with what industry is striving to do in specialized training, and the qualities necessary to enter such selected positions. The better boys from our technical schools are soon equal in experience to those having three to four years' experience in the technical departments of plants. To succeed in the electrical industry, the modern boy needs a minimum of grammar school education, some native curiosity in experimenting in electricity, such as a workable knowledge in radio building and some skill in manipulating the mechanical devices about the modern home. A recommendation from the personnel department is almost equivalent to employment, and while there are no ready-made successful men from either trade school or college, promotion depends on continued acquiring of ideas and knowledge.

Mr. N. F. Fultz, vocational director, J. Sterling Morton High School, Cicero, Illinois, introduced the subject: Trends in Industrial Education. "Industry," said Mr. Fultz, "is raising the standards of employees and is raising the age limit as well. The result is that the boys are on our hands. Our program then as educators is twofold: (1) A demand for funds which will stand the shock of budgeting and (2), some standard of work which a boy can do and not duck. No boy should be placed at work until he will stick. What, then, can boys do or get? Boys are encouraging, changing, or negative. The teacher holds his job because he teaches. In industrial arts work the most serious problems are the large and increasing classes of 28 to 36. The economic forces in a community will stand for and insist upon good work. Hence, when work is standardized it is a measure of how far to carry education to avoid the saturation point.

The teacher must know the boy of today; he must know his general ability and somewhat of the financial ability of the family too. The product of the school is a balanced boy. Industry may need the trade worker and the "trade training school" is the answer. Part of this work may go along in the same room with pre-engineering courses in higher schools, but what a boy gets is not and cannot be determined by the calendar. It is a question—"Why are some boys in high schools?" A study of profits in mathematics classes frequently shows much the same as in the advanced shop work and we must have faith that

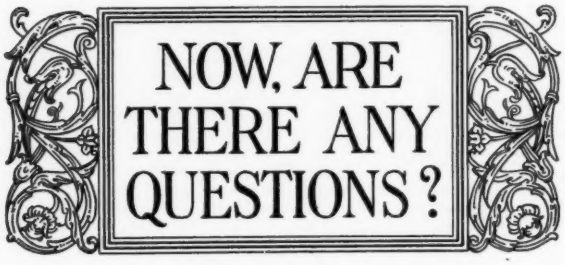
a boy may reach the same level in industry before he gets through."

Mr. Enge of the Tilden technical high school, advocated the double diploma as given in some of the Milwaukee schools and a future meeting will take up this topic for discussion.

Mr. Albert Fertsch said that it was most important to bring a boy's determination up to the sticking point first. School work frequently leaves a trail of un-done jobs. Then make the boy realize the constructive value of imagination and train that. Love of work, pride, and ideals come with supervised experiment. Regardless of what level the boy may work, skill and even knowledge counts for less than the personal traits we all possess.

Mr. F. S. Hurd reminded us that a boy needs both his head and his hands trained. Such co-related training is good for any job, technical or otherwise.

Mr. Robert Woellner of the University of Chicago claimed that frequently educators—even college presidents—change their minds about industrial education. We, in this field, do what the other branches fail to do or only partly do. We, in advance of the other branches, recognize the individual. Our books and text material is often in the form of unit lessons and job sheets. We are sensitive to the learning rate and personality of the boy.



Cost of Wood Finishing Materials

Q. 577. Will you please tell me the best way to get at the approximate cost for the wood finishing material that is used by the students. The school buys this material but in return they expect the students to pay back a reasonable amount. No doubt some students use more material than others, as the problems are larger, etc. They all use out of the same varnish can as well as stain. I would like to know how other manual training teachers handle this problem. I want the students to pay only for what they use and, of course, we cannot charge them the same price regardless of the size of the problem.—L. T. W.

A.: This has long been a perplexing problem to others than yourself as regards the determination of finishing costs when returned payment is foolishly demanded by local boards of education. This determination is especially difficult in view of the fact that the models vary considerably; some students are careful where others waste copiously; not to mention the inevitable, occasional accident with its loss of material.

From time to time I have seen various cost finding sheets and cards which propose to take care of these difficulties but if they were filled out and posted correctly, there would be no models completed in the shop or instruction offered by the teacher. The way in which I have arrived at this in several instances was to have the class as a whole make a type model and complete it, through the entire program of finishing, keeping careful watch and record of the various materials required. The costs were then divided pro rata. In one case this worked out 7½ cents, for which I made a blanket charge of ten cents to allow for wear and tear on brushes, equipment and loss of material through accident or evaporation. By carrying this program out occasionally over a number of widely different types of models very accurate costs can be determined and, if a 25 or 30 per cent overhead is allowed as in the instance mentioned, the books will show up correctly, the teacher is justified and the student satisfied at the nominal charge since he has been given a chance to know how it was assessed with the attendant reasons.

In the case of the student who makes home furniture or refinished furniture brought from home, he is given a list of the correct materials which he buys from his own pocketbook, thereby doing away with all discussion as to costs on this class of work.

If these accounts are posted in a ledger or a file card, the instructor has at hand a source of accurate information which enables him to make quick and accurate estimates so as to be on the safe side of his judgment when a new project is developed. For instance, I was not satisfied with the price of $45 which a large manufacturer was asking for domestic science tables, 30" high, 36" wide, and 66" long. I put through ten of these tables to prove my point, turned out a better mechanical job; finished in three coats of floor varnish as against two coats of shellac, and delivered the tables at $13.89. Of course, there was no labor charge since this item was for materials only, but it simply goes to show what can be done with the facts at hand.—R. G. Waring.

Refinishing Chest of Drawers

Q. 604. I have an old-fashioned chest of drawers which has a red mahogany veneer. I have scraped the finish down to the clear mahogany veneer. It is my desire now to finish this so that it will match a modern, combination gum wood and mahogany bed. The finish on the bed is more on a brown than a red.—G. J. O.

A: Perhaps the best way to refinish the chest is to use a walnut water stain on the freshly sanded veneer, let dry and size with a wash coat of diluted orange shellac which has been tinted with alcohol soluble Bismarck Brown, which will make the shellac red and alcohol soluble nigrosine which will make the red shellac any shade of brown. The shellac should be applied with a Fitch or bear brush and should be made from stock cut with at least three volumes of denatured alcohol. One or two coats may be applied, the last of which should be sanded with split 6-0 garnet paper, until glass smooth. A walnut filler, made on a silex base should then be well padded in and allowed 48 hours to dry. Instead of using clear varnish, the first coat should be dark oak varnish stain, the second walnut varnish stain, and the third clear varnish. By varying this practice by the addition of an extra color coat of either the dark oak or walnut varnish, practically any depth of tone can be secured, which will match up the more modern piece, especially after it has been rubbed dull with FF pumice stone, felt pad and water or crude oil.—Ralph G. Waring.

Heating Glue

Q. 611. Does it hurt glue to heat it in an electric pot which is direct heat and not double boiler system?—F. R.

A: Our answer is as follows: An electric glue pot of the proper construction does not heat the glue solution direct and while there is a certain advantage in using a glue pot with a water jacket, on the other hand the possibility of overheating, which is disastrous to the strength of the glue, is avoided in using the electric equipment. A dry heat created by the electric pot is not as favorable as steam or hot water heat, but as indicated above, there are other advantages to offset this. For preparing glue in small batches, as is the case in manual training departments, and where boiling is the chief evil where hot water is used—we strongly recommend electric glue pots.—Edwin D. Wilhelm, Pittsburgh, Pa.

THE NIB ON THE BACK OF HAND SAWS

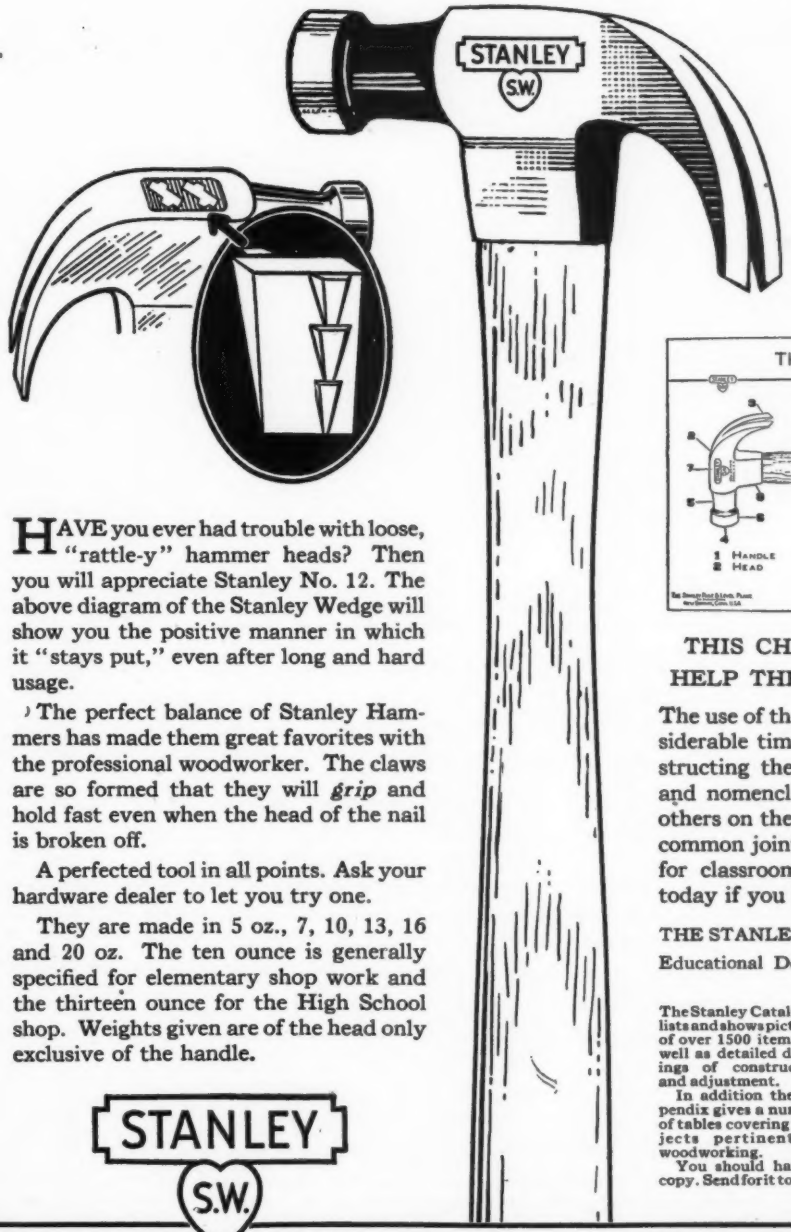
To the Editor:

In the April number of the Magazine, F.K.F., asks the reason for the nib on the back of a handsaw near the point. The Disston people should know why it is there, as they are one of the few saw manufacturers who still put it on their saws, but evidently they have forgotten, for Mr. Zimmerman's explanation is incorrect. It is not there for looks. In olden times it was customary to fasten a strip of wood with a slot cut in it over the edge of the saw to prevent damage to the teeth while it was being carried in a tool box. The wood was fastened to the saw by two strings, one passing through the handle and the other over the nib, which prevented the string from slipping off, and was there for that purpose. So far as appearance is concerned a saw looks just as well without the nib, if anything a little better.—**Arthur E. Edmonds**, April 16, 1926, El Monte, California.

Mr. Lynn E. Stockwell, of Los Angeles, Calif., has been appointed director of vocational education at Fresno, Calif., and head of the vocational teacher-training department of the State Teachers' College at Fresno. Mr. Stockwell was formerly assistant supervisor of vocational education at the University of California.

Mr. C. Valentine Kirby, state director of art education for Pennsylvania, has been named as a member of the advisory group of the Carnegie Corporation of New York. The Corporation is continuing its inquiry into the place of the arts in American life. Mr. Kirby acted in a similar capacity last year when grants totalling three-quarters of a million dollars were made for the advancement of art in America.

This head won't come off! It's a Stanley No. 12

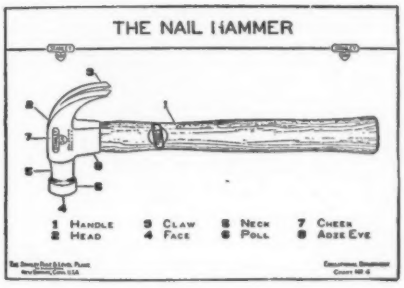


HAVE you ever had trouble with loose, "rattle-y" hammer heads? Then you will appreciate Stanley No. 12. The above diagram of the Stanley Wedge will show you the positive manner in which it "stays put," even after long and hard usage.

The perfect balance of Stanley Hammers has made them great favorites with the professional woodworker. The claws are so formed that they will *grip* and hold fast even when the head of the nail is broken off.

A perfected tool in all points. Ask your hardware dealer to let you try one.

They are made in 5 oz., 7, 10, 13, 16 and 20 oz. The ten ounce is generally specified for elementary shop work and the thirteen ounce for the High School shop. Weights given are of the head only exclusive of the handle.



THIS CHART WAS MADE TO HELP THE BUSY INSTRUCTOR

The use of the above chart will save considerable time and aid materially in instructing the pupil in the construction and nomenclature. This chart and the others on the plane, chisel, screw driver, common joints, try square, etc., are free for classroom display. Send for them today if you have not been supplied.

THE STANLEY RULE AND LEVEL PLANT
Educational Department, New Britain, Conn.

The Stanley Catalogue lists and shows pictures of over 1500 items, as well as detailed drawings of construction and adjustment.

In addition the appendix gives a number of tables covering subjects pertinent to woodworking.

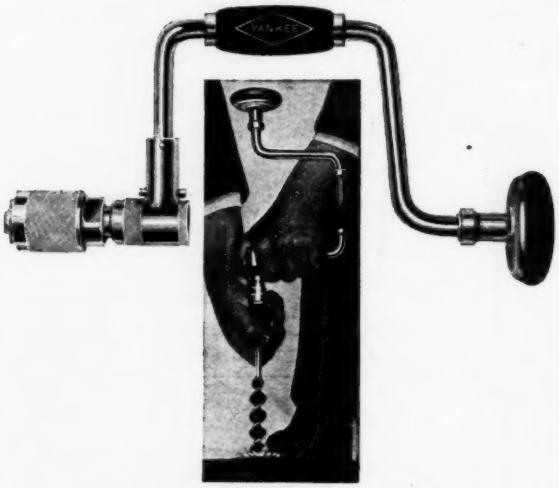
You should have a copy. Send for it today.

STANLEY
S.W.

STANLEY TOOLS

STANLEY EQUIPMENT IS STANDARD EQUIPMENT

Good Schools Deserve "Yankee" Tools



Try this test—Yourself

Put auger bit in the chuck of "Yankee" Brace No. 2100. Bore deep into tough wood. Then pull upward with all your strength. Bit will not come out of chuck.

For this new "Yankee" Bit-brace Chuck is the most efficient ever made. Ball bearing, quick centering, and accurate.

You can slip into it any shape bit (round, square, any taper) and the bit is there to stay until you wish to release it.

This wonderful "Yankee" Brace is made especially for the man who appreciates a superior tool. For the man who wants accuracy and efficiency. For the man who knows that there is real economy in using the finest tool of its kind because it saves time and labor.

And this new "Yankee" has the famous "Yankee" Ratchet. Smooth as stem-wind of a watch, yet unbreakable. Dust-proof and moisture-proof. The handles are hard rubber and indestructible.

"Yankee" nickeled finish—the most durable known.

Some Other "Yankee" Tools

Ratchet Hand Drills
Automatic Feed Bench Drills
Automatic Push Drills
Ratchet Screw-drivers
Ratchet Tap Wrenches
Vises, with Removable Base

Dealers Everywhere Sell "Yankee" Tools.

"Yankee" on the tool you buy means the utmost in quality, efficiency and durability.

Free Tool Book

Tells all about the famous "Yankee" Tools. Write for your copy today. .

NORTH BROS. MFG. CO.,
PHILADELPHIA, U. S. A.

"YANKEE" TOOLS

Make Better Mechanics

A TYPOGRAPHIC CONTEST FOR PRINTING STUDENTS

A typographic contest for students of printing was held April 29th to May 8th, in connection with the second annual education exposition in New York City. The contest was intended to promote interest in the Sesquicentennial of the Declaration of Independence, and was open to students in schools of printing within the New Netherlands territory, comprising New York and New Jersey and Connecticut west of the Connecticut river. The contest was conducted in accordance with specifications and general rules, but each contestant was permitted to use his judgment in the choice of type faces, ornamentation, borders, and arrangement. The competition was judged on the basis of fitness, simplicity, legibility, harmony, balance and appropriateness of ornamentation.

The contest attracted considerable attention. Specimens were submitted by 76 pupils from the cities of Buffalo, Ithaca, Yonkers, New York, and Brooklyn in New York State; from Jersey City, Bayonne, Westfield, and Camden in New Jersey, and from New Haven, Conn. The judges were Mr. Edmund Gress, editor of the American Printer; Mr. Charles Francis of the Francis Press, New York City; and Mr. Frank Alvah Parsons, of the New York School of Fine and Applied Arts. The education department of the American Type Founders Company supervised the contest.

Four awards were made in connection with the contest, consisting of cash prizes of $10 and $5 for first and second places respectively, and certificates of merit for the third and fourth places. The judges also accorded honorable mention to six other entries which they deemed worthy of special attention.

THE WESTERN ARTS CONVENTION

The Western Arts Association will hold its next convention at Milwaukee, Wis. The local arrangements for the meeting will be directed by Mr. Charles F. Perry and Mr. A. G. Pelican of the Milwaukee public schools.

The preparation of the program will be in charge of Mr. Elmer W. Christy of Cincinnati, president of the Association.

NEWS AND NOTES

New York Printing Teachers Form Association. The printing teachers' group of the Eastern Arts Association held a meeting on April 24th in connection with the convention held at Syracuse, N. Y. The meeting was addressed by Mr. James M. Lynch, president of the International Typographical Union; Mr. Henry H. Denham, of the Blodgett Vocational High School, Syracuse, N. Y.; Mr. Frederick A. Coates, assistant agent for industrial teacher-training of Massachusetts; Mr. H. E. Milliken, head of the printing department of the boys' trade school, Worcester, Mass., and Mr. Harry P. Bohrer, Monroe high school, Rochester, N. Y.

The offices of the association who comprise the executive committee, are planning a membership drive with the aim of having every teacher in New York State a member of the association in 1927. The purpose of the association is the improvement of the instruction in printing.

Fourth Annual Yacht Regatta. The fourth annual school yacht regatta was held at Westlake Park, Los Angeles, California, on June 19th. The competition was governed by practically the same rules responsible for the huge successes of the 1923, 1924, and 1925 regattas, and the Evening Herald again offered four beautiful silver trophies to the winners of the fourth annual races.

This year's regatta eclipsed past events in the number of entries and the quality of model boats. Three trophies were awarded to the winners of first, second, and third place with craft measuring between 34 and 36 inches over all and not more than 600 square inches of sail area.

Another cup was presented to the winner of the race for boats measuring under 34 inches long and sailed by an entrant attending a Los Angeles elementary school.

Second and third place winners in this class were presented corinthian diplomas by officials of the city school department.

The race for the 34-36-inch class craft was for students of the seventh and eighth grades of elementary schools, junior high schools, senior high schools, and private institutions in Los Angeles.

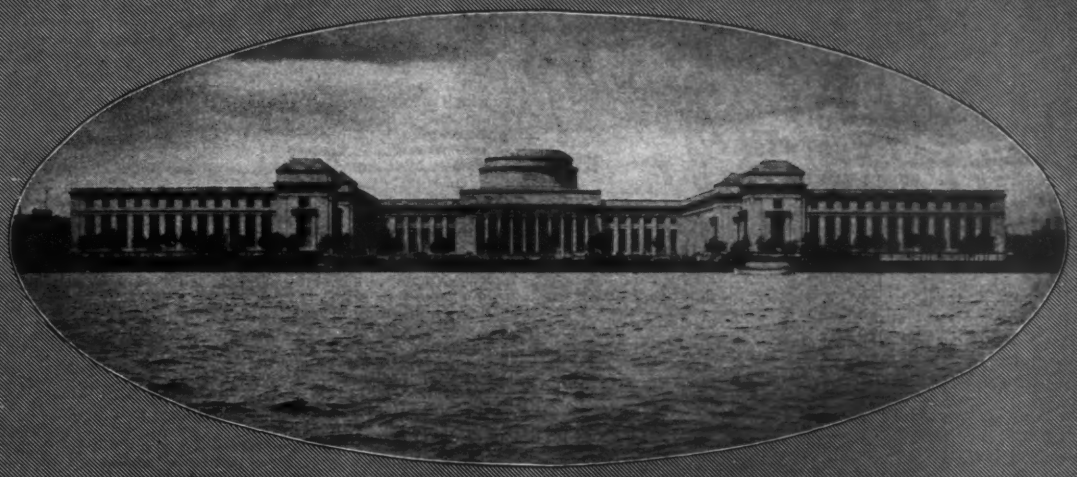
The Evening Herald trophies were in the form of three large silver cups, graduating in size for the first, second, and third place winners in the 34-36-inch class, and a medium size cup for the winner of the race for boats under 34 inches long.

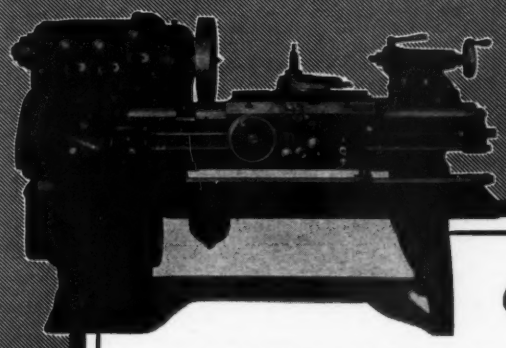
The races were staged under the auspices of the Southern California Yachting Association with flag officers of the Los Angeles Model Yacht Club, the California Y. C., Skippers' Club, the Newport Harbor Y. C., Catalina Island Y. C., Southland Sailing Club, and the Los Angeles Athletic Club officiating. Mr. E. B. Schock and Mr. D. M. Callis, builders and designers of racing and cruising power and sailing craft on the Pacific coast, acted as official measurers of the competing craft, and other officials acted as judges of the regatta, the starting, finishing, course and awarding of trophies. Among these were F. A. Bouelle, assistant superintendent of the Los Angeles schools; W. S. Kienholz, director of vocational education; C. A. Kunou, supervisor of elementary manual arts, and T. E. Lander, model yacht builder and a member of the Philadelphia Model Y. C.

Part-Time Trade Schools in Dayton. A part-time school for trade apprentices has been opened on the second floor of the Pryor building at Dayton, O., in which are housed plumbing, bricklaying, and carpentry schools, as well as part of the retail selling school.

A part-time trade school was established a year ago for plumbing apprentices in the Roosevelt high school. The department has been moved to a new location which enables apprentices who work in the outlying sections of the city to get to school on time. The apprentices work in the morning and attend school in the afternoon.

(Continued on Page 24a)





and now —

The Massachusetts Institute of Technology uses The

MONARCH Helical Geared Ball Bearing LATHE

as a part of their Metal Working Equipment.

The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

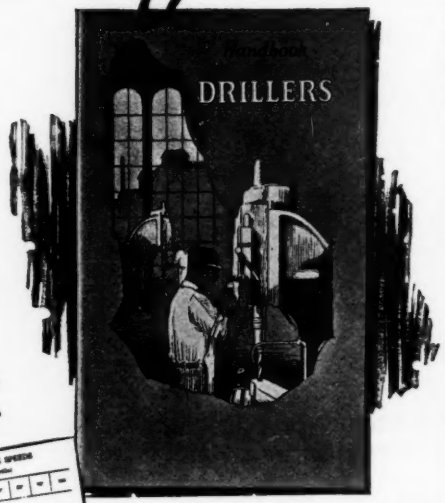
In choosing the equipment for these students, the directors of the Institute must base their choice upon equipment that will give students the greatest possible amount of experience.

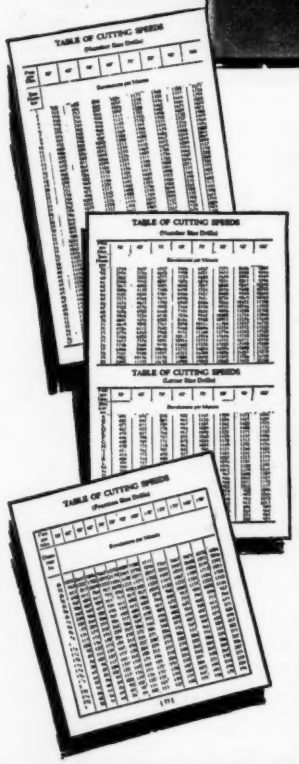
We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

THE MONARCH MACHINE TOOL COMPANY, 404 OAK STREET, SIDNEY, OHIO.

Do you know the right drilling speeds?





AT what speed and feed should a 1/16-inch carbon steel drill be started? A 1/4-inch high speed steel drill? What is the difference in the starting speeds when drilling in machinery steel, brass and cast iron? How many revolutions per minute does a 5/16-inch drill make operating at a speed of 50 feet per minute?

All of these questions are answered for you on pages 32 to 35 of the Handbook for Drillers, which Vocational School Directors and Instructors tell us is the most authoritative textbook on twist drills and drilling practices published.

As our contribution to vocational education, we want to send copies of this Handbook, in any reasonable quantities, to Directors and Instructors for use in their machine shop classes.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

Manufacturers of Carbon and Cle-Forge High Speed Drills for every purpose; "Mezzo" Super-Carbon Drills; Hand, Jobbers' and Shell Reamers; "Peerless" High Speed Reamers; "Paradox" Adjustable Reamers; "Quick-Set" Reamers; "Spirex" Machine Taper Pin Reamers; Chucking Reamers for Turret Lathes; Counterbores; Countersinks; Sockets; End Mills; and the "Exy-Out" Screw Extractor.

(Continued from Page 22a)

There are at present 62 apprentices in the day school coming from 45 different firms in the plumbing industry. Besides the apprentices attending in the daytime, there are 167 journeymen and apprentices attending the school in the evening classes.

Evening trade and extension schools in bricklaying and carpentry are conducted in the building as night classes. Practical work, as well as science and theory, are given in the courses, which are organized on the basis of the number of years the apprentice has been working at the trade.

Regional Conference for Vocational Education. The ninth annual regional conference for the Pacific Region was held at Casper, Wyo., during the week of May 24th. It was a joint conference of vocational education workers, placing the emphasis upon the oil industry with some thought to railroad transportation.

Farm Shop Work. The department of vocational agriculture of the Johnson County High School at Buffalo, New York, conducted an evening school for farmers in farm shop work which was of considerable interest. The course was started in February and closed in March. Two lessons a week were given and nineteen adults were enrolled in the classes.

New Auto-Mechanics Buildings. At Casper, Wyo., an auto-mechanics building was completed in February last. The building was designed by the high school trade drafting class and is well lighted and convenient. It is equipped with overhead light, traveling hoist, work pit, and hot water wash rack.

Evening Classes in Home Making. Evening classes in home making have been conducted in various centers in Wyoming in the past few years. The classes are organized for home makers and the contents were based upon the desires of the women enrolled. Classes in the subjects of millinery, garment construction, and food preparation were offered. During the last year Casper held classes in food preparation, millinery, dressmaking, and sewing; meal planning and clothing construction classes were held at Rock Springs, and clothing classes at Laramie and Frontier.

Vocational Part-Time Classes. The vocational division of the Wyoming Department of Education has cooperated with the Cheyenne school board and the Union Pacific Railroad Shops in organizing two part-time trade extension classes and twelve part-time trade preparatory classes for 150 boys and men.

Classes are taught in the subjects of shop mathematics, shop practice, air brake instruction, shop drawing, locomotive inspection, blue print reading, and boiler shop practice.

The work is under the direction of the vocational division of the state education department, the public schools of Cheyenne, Mr. J. L. Goins, director of part-time and evening school work, and Mr. T. P. Fox, Union Pacific Supervisor of Apprenticeship Training.

Millwriting Course. In order to meet the demand for the "handy man" type of millwright in textile factories, the New York City board of education has adopted a two-year course of study in millwrighting for use in the textile high school.

Summer Courses in Pottery. Lewis Institute, Chicago, Ill., is offering a summer course in practical pottery, comprising two classes to be conducted from June 28th to July 23rd, and from July 26th to August 20th. The course offers instruction in the origin and properties of clays, practical work in pottery making, methods of decorating, glazes, mould making, and operation and care of kilns.

Summer School of Printing. The annual summer session of the U. T. A. School of Printing will be held from June 21st to July 31st at Indianapolis, Ind. Courses will be offered in typography, linotype, monotype, presswork, paper, color, cost finding, and estimating. Information concerning the courses may be obtained from Mr. T. G. McGrew, superintendent of the U. T. A. School of Printing, 1500 E. Michigan St., Indianapolis, Ind.

Printing Instructors Hold Convention. The fifth annual convention of printing instructors will be held June 30th to July 2nd, at the U. T. A. School of Printing, Indianapolis, Ind.

Master Plumbers' School. The Master Plumbers' Association of St. Louis, Mo., has made arrangements with the Ranken School of Mechanical Trades to hold a special night course. The course opened with 95 students enrolled in the subjects of master plumbing and bookkeeping of plumbing work. It is under the direction of the Plumbers' Trade Extension Bureau and will continue until September.

New Printing School in West. A new printing school has been established at Denver, Colo., sponsored by Warner Brooks, of the Smith-Brooks Printing Company. It proposes to offer high school graduates an opportunity to become specialists in printing crafts.

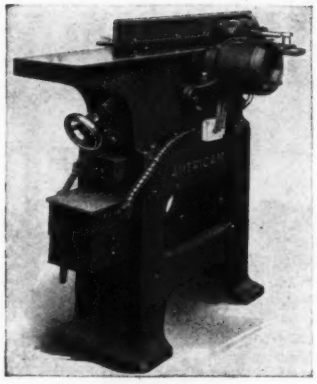
Training Class for Teachers. A training class for teachers of apprentices in printing has been opened at the Central High school, Detroit, Mich. The class is for superintendents and foremen responsible for the training of printing apprentices.

Girls Elect Printing. Four girls of the technical high school at Omaha, Neb., have elected printing as their major course. The girls expect to become proficient at the trade and to follow it after graduation. Three of them come from families of printers.

Paper and Pulp Manufacturing. Thirty-seven Wisconsin paper manufacturers have contributed toward the preparation of a set of textbooks to be used in the teaching of paper and pulp manufacturing. The textbooks are the work of the technical association of the pulp and paper industry and the technical section of the Canadian Pulp and Paper Association. They will be used in a course in paper manufacturing to be given under a joint arrangement with the Appleton, Kaukauna, and Neenah-Menasha mills in vocational schools of the four cities.

Printing Courses at Ocean City. An opportunity to combine

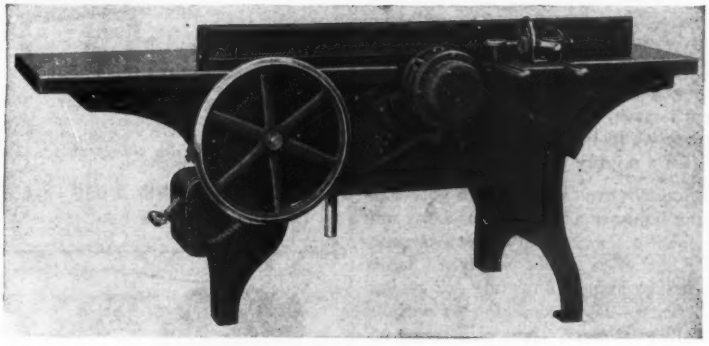
(Continued on Page 27a)



American No. 1 Bench Jointer

Knowledge Gained on American Machines will never Desert You

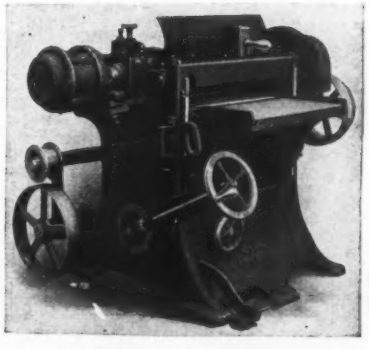
Training in Shop Practice should always be done on real shop machines.



American No. 1 Buzz Planer and Jointer

American Machines spring from the highest requirements of the industries. They are industrial machines.

"The tools of school are the tools of life"



American No. 1½ Single Surfacer

Yates-American Machine Co.

Educational Department

ROCHESTER, N. Y.

"Betcha! F' work'r tinkerin' It has 'em all beat"—

"I can remember when we packed seven tools around to do what that Starrett Combination Square does. An' then they didn't do it any better. Mebbe not so good. There's a marking gage, a rule, a square, a miter, a depth gage, height gage, level and plumb, all in that combination an' each of 'em a mighty good tool all by itself.

"I dunno's there's any tool I got—barrin' a hammer an' saw—that I use any oftener. I always take it down to camp with me an' it comes in mighty handy when I'm fixing things up. An' around the house—say, I wouldn't be without it. If you haven't one of 'em, go an' get one—quick. Most any hardware dealer will fix you up."

THE L. S. STARRETT CO.

World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes - Standard for Accuracy

ATHOL, MASS.

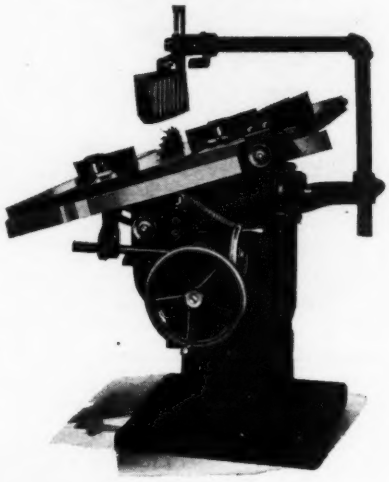
No. 94

Ask your dealer to show you this Combination Square. Ask us for a free copy of the big Starrett Catalog No. 23-"CE."

9218

Starrett Tools

The No. 131 Motor Driven Variety Saw



The No. 131 Variety Saw has a Ball Bearing motor mounted on the saw arbor. Push buttons start and stop machine. With 16 inch saw will cut 3¼" thick.

Complete description sent on request,

Hall & Brown Wood Working Machine Co.

Broadway, Tyler, Ninth Sts. ST. LOUIS, U. S. A.

Good tools help make good workmen

Here is a high speed ball bearing lathe which proves that safety is not incompatible with high speed, accurate work, and pleasing design.

While primarily designed for use in manual training schools, it is capable of turning out work which would delight the heart of the most fastidious craftsman. We sell many to schools on the basis that respect for good tools is an important part of any course in manual training.

The same high standards make "American" saw benches, planers, jointers, band saws and workers preferred by instructors who want their students to have the best there is.

Write for free booklet.

AMERICAN SAW MILL MACHINERY CO.
74 Main St., Hackettstown, N. J.
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American Manual Training Equipment

KESTER *Self-Fluxing* SOLDER

Genuine Solder Containing its own Flux—Easy to Use—Requires Only Heat

In the Electrical Shop — Use Rosin Core

What constitutes a well soldered joint and a poor soldered joint is quickly understood on the part of the boys after they have completed their first job with Kester Rosin-Core Wire Solder.

Kester supplies a pure rosin flux from tiny pockets within itself as it is used, making it necessary to supply only heat. Hence boys will appreciate the ease and satisfaction with which they complete their soldering projects and will be rewarded by better markings.

With this smooth flowing virgin tin and lead solder, unskilled boys can really do jobs that have a workmanship like finish.

Send for a test sample.

KESTER *Acid Core* SOLDER

For general soldering on new or old work in the general shop, sheet metal shop, home mechanics shop, specify Kester Acid Core Wire Solder.

CHICAGO SOLDER COMPANY,
4259 Wrightwood Ave., Chicago, Ill.

Gentlemen:

Please send the following number of working samples:

.....Kester Acid Core Wire Solder

.....Kester Rosin Core Wire Solder

The number of boys in our shops are:

General Shop.....Electrical.....

Sheet Metal.....Home Mechanics.....

Signed.....

Instructor in.....School.....

City..... State.....

KESTER *Rosin Core* SOLDER

For all electrical soldering and radio work specify Kester Rosin-Core Wire Solder. Absolutely non-corrosive flux.

(Continued from Page 24a)

profit and pleasure at one of the delightful resorts on the Atlantic coast is offered at Ocean City, N. J., this summer. Three courses in printing will be conducted at the summer school to be held from June 28th to July 31st.

The course in the principles and practices of printing is intended to equip the teacher in service, with a knowledge of the principles and practices of the printing occupations, to enable him to teach the subject in manual training or prevocational classes. The teacher-training course includes analysis, organization of course of study and methods of teaching the printing occupations, and is for practical printers who desire to teach, but are without training as teachers. For tradesmen, the minimum requirement is nine years of trade experience, including apprenticeship, and general educational qualifications satisfactory to the state board of education.

A course in linoleum block printing of special interest to teachers of art and of printing will also be offered. Instruction of an elementary nature for the beginner and special instruction for the experienced teacher will characterize the course which includes designing, cutting, and printing of the blocks.

School Obtains Printing Presses. Mr. J. Horace McFarland has presented to the school district of Harrisburg, Pa., two printing presses and one folder, valued at $3,000.

Safety Motion Picture Films. Three new mine-safety motion picture films of one reel each—"Twelve Points of Safety," "First Aid to the Injured," and "The Use and Care of Mine Rescue Apparatus," may be secured free of charge to schools by application to the experiment station of the United States Bureau of Mines, Pittsburgh, Pa.

Trade Classes for Apprentices. The registration in evening trade classes for apprentices in the building trades in New Jersey Vocational Schools showed an eighteen per cent increase over last year's registration. Reports from the various districts show that 2,568 apprentices are enrolled in these evening classes in 21 cities. Paterson, Atlantic City, and Newark have the largest enrollment.

Shop Work Undertaken. Shop work has been much in evidence the past semester at the Austin-Cate Academy, Center Strafford, New Hampshire. The older boys gave a thorough overhauling to a Chevrolet and the younger boys devoted themselves to various projects in woodwork and forging. The school has fifteen boys enrolled in agriculture, which amounts to one-third of the school enrollment, and more than half the total number of boys.

New Jersey Shop Teachers Meet. The shop teachers of southern New Jersey held their monthly meeting and banquet on April 27th. at Swedesboro, N. J. Mr. Fidler, supervising principal of the Audubon schools, gave a talk on "Audubon Shops and Aims." The purpose of the meetings is to exchange ideas and to discuss problems connected with shop work. The organization is represented by nearly every community in the southern section of the state.

Vocational Courses. A feature of the vocational classes in sheet metal at the Berriman junior high school, New York City, is the work in the designing of window boxes and flower pots. A number of original designs have been submitted.

The sheet metal shop offers two courses. In the prevocational short course, pupils are taught how to construct a number of small, useful objects. Each pupil is required to make a pattern before constructing an object as a means of determining whether he has any aptitude for the work.

In the vocational course for students intending to follow sheet metal work as a trade, the work covers two years and includes the fundamental operations employed in the trade. The pupils are given an insight into the working of the sheet metal industry and are encouraged in the development of originality through the design of objects.

Smith-Hughes Vocational Agriculture. A Smith-Hughes course in vocational agriculture will be inaugurated in the high school at Mineral Point, Wis., beginning with September. Mr. W. S. Jacka will be the instructor.

—Canandaigua, N. Y. The board of education has discontinued its part-time school which it had conducted for five years past. The legislature amended the continuation school law two years ago, making such schools compulsory for cities having two hundred eligible students. For two years the town conducted the school voluntarily, even though it had less than the required two hundred students.

Apprenticeship Commission Appointed. State Supt. Francis B. Haas of Pennsylvania has announced the appointments to the Pennsylvania State Apprenticeship Commission in the plumbing and heating industry. The members representing the various phases of the plumbing and heating industry are:

Master plumbers, Richard Turner, Wilkes-Barre; journeymen plumbers, E. D. Barry, Erie; master steamfitters, Alex. McClintock, Philadelphia; journeymen steamfitters, L. A. Green, Pittsburgh; school system, C. F. Bauder, Philadelphia.

State commissions for other trade groups are to be appointed in the near future.

Extend Part-Time Education. Massachusetts will substitute half-time schooling for the present four-hours-a-week plan for children 14 to 16 years of age, under a bill sponsored by the state education department and by many state organizations. The bill is the outgrowth of a report of the Massachusetts Superintendents' association following two years of study.

School Prepares Printers. The department of printing of the Frank Wiggins Trade School, Los Angeles, California, is equipped to teach the fundamental principles, theory, and practice of the printing trade, so that a student receiving a certificate, is qualified to enter the printing industry. The department does not

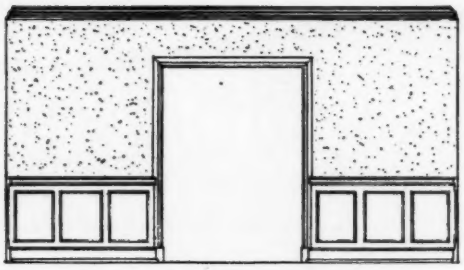


Fig. A. Low Panels with Cased Opening.

Paneling in Walnut

a fascinating subject described in our new free book

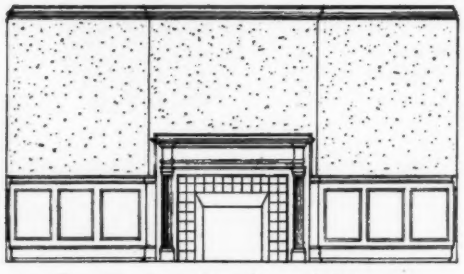


Fig. B. Low Panels with Mantel.

THE above two illustrations from our new booklet "American Walnut for Interior Woodwork and Paneling" indicate the interest this volume has for the manual training teacher and student. The book is packed with instructive material; it gives complete information regarding paneling and interior woodwork in walnut and other woods; there is a chapter on walnut finishes; and much other material of interest to the craftsman in woods. Why not have your pupils work in walnut so that the articles they fashion will have permanent value? Walnut costs so little more that boys will gladly pay the extra cost. Write for "American Walnut for Interior Woodwork and Paneling" today.

AMERICAN WALNUT

"THIS IS THE AGE OF WALNUT"

American Walnut Manufacturers' Association
Room 1255, 616 S. Michigan Ave., Chicago

L.A. 6-26

Please send
"American Walnut for Interior Woodwork and Paneling"

aim to turn out journeymen printers trained in more than a knowledge of the trade, but the printing graduate enters the industry as an advanced apprentice in the trade. In some cases, a student elects to remain in the school until he becomes a journeyman in production, as well as in knowledge.

Hand, linotype, and monotype composition are taught by experienced teachers. The machine section operates twelve linotype machines and a complete monotype unit.

Pupils Compete in Vocational Projects. Seven thousand Pennsylvania boys and girls competed in the second annual state-wide junior and senior vocational project contests sponsored by the State Department of Public Instruction. In all, 32 medals and 50 ribbons were awarded. A 17-year-old high school boy won two gold medals, one for the best potato project, and one for the best fruit project. Nine farm boys and girls netted this year nearly $5,000 from their projects.

New Course in Art. A new course in fine and industrial arts, prepared for the public schools of Seattle, Wash., will be ready for use in September next. The course has been prepared after a study of reports from other cities. It includes work suited to the special needs of slow and strong classes and outlines the lessons for each grade, month by month.

Issue New Publication. The Frank Wiggins Trade School Review is a monthly publication of the new trade school in Los Angeles which is under the direction of Mr. H. A. Campion. The paper prints articles, pictures, and announcements concerning the work of the school.

New Positions Created. The school board of Fall River, Mass., has created the positions of director and assistant director of drawing. Mr. W. E. Braley has been appointed as director, and Miss Alma S. Bennett as assistant.

Will Erect Motor Shop. A course in automobile repair work, gas engine, electric motor and battery work has been introduced at the high school, Hutchinson, Kans., beginning with next fall. The department will be housed in a new building to cost approximately $17,000. The building will be one story high and will adjoin the present shop building, which will be used for architectural drawing classes.

Teachers Inspect School of Industry. Vocational instructors of Stockton, Sacramento, and Modesto, California, recently inspected the Ione School of Industry. The party was organized by F. R. Love, director of vocational education at Stockton, and was composed of faculty members of the part-time school, the vocational department of the high school, the prevocational school, and the grammar grade manual training department. Mr. Frank Vincent, in charge of vocational education in Sacramento, was in charge of a group of teachers.

Trade School Planned. To meet a new program for vocational education at Tampa, Fla., the Brewster Vocational School will be enlarged with the addition of two wings, each of which are to contain shops on the first floor and classrooms on the second. The industrial classes will be composed of pupils diverted from the grammar and high schools who would otherwise leave school early. They will be given academic work in addition to practical instruction in trades. The regular opportunity school will be continued for the benefit of the evening vocational students.

Vocational Training at High School Age. Dr. John H. Brewer, chief of the vocational work at Harvard University, speaking recently before the members' council of the Association of Commerce at New Orleans, stressed the need of more attention to vocational training for the youth. He holds that where young people are encouraged to prepare for a vocation at high school age, attention to vocational guidance must be given, or a large part of the training will be wasted and the students will take up vocations for which they are unfitted.

New Vocational School. A vocational school unit and gymnasium is in process of erection at Oshkosh, Wis. The building will contain three floors; the ground floor will provide space for the woodworking shop, the auto mechanics department, the machine shop and the mill room. The first floor will contain the administrative offices, classrooms, a school for the deaf, a printing department, and other special divisions. The top floor will contain departments for girls activities and will include a large assembly room.

Student-Built House. Under the direction of the instructor, the boys of the Deerfield-Shields Township High School at Deerfield, Ill., have completed a cottage. The building has been erected and equipped by the boys and will be auctioned to the highest bidder.

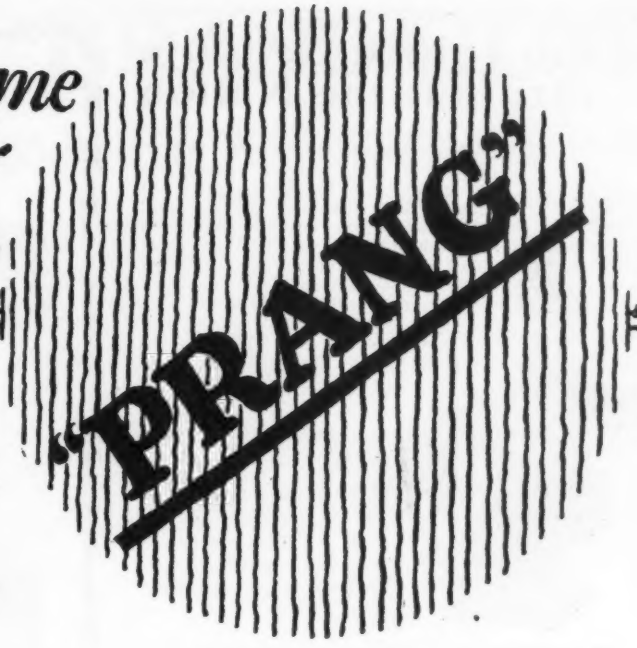
Northern California Teachers Meet. Teachers of 28 high schools in northern California met at Marysville in connection with the first convention of the vocational teachers' association of northern California. The purpose of the meeting was to bring the teachers closer together in mutual understanding and to stimulate interest in vocational education. Manual training, industrial arts, and commercial education were the departments represented at the convention.

Kansas Certifies Mechanics. The Kansas State Board of Vocational Education, in cooperation with the public school systems, has conducted evening classes looking to the certification of mechanics. Each person who attends an evening class in Kansas is entitled to a certificate of progress. With the completion of all the short units of instruction, a certificate of accomplishment is given by the state board.

Evening Classes in Printing. Journeymen printers at Parsons, Kans., met during the spring to study advanced layout of display work. In Wichita, the apprentices of the city attended an evening class for the purpose of studying the typothetae lessons in printing.

Plan Reading and Drawing. Carpenters of Augusta, Newton, and Wichita, Kans., studied the reading and drawing of plans during the past winter. The work was taken as a means of increasing their knowledge of the trade.

This Name is Your Protection



Another Victory for American Industry

THE American Crayon Company made the world's first blackboard chalks in 1835, about the time the first railroads were being constructed. Contrary to a general impression, however, the colored drawing crayon was unknown until about 1890. At that time, a man who is still active in The American Crayon Company organization, worked out and introduced this medium which has played such an important part in school art development during the intervening years.

Many years ago, Louis Prang introduced the first water colors into American schools. These were imported from Germany until the year 1914. That year, the World War cut off the previous source of supply. Since then The American Crayon Company has made all of these colors at their own factory at Sandusky, Ohio. By the end of the World War, it was realized that the domestic product was superior in every detail to that which had formerly been imported—a source of genuine gratification to every real American.

The American Crayon Company cannot refrain from taking pride in having been so closely identified with the production of the world's first blackboard chalks, colored drawing crayons, and the first water colors used in American schools.

Referring to "Prang" colors, make sure that the name "Prang" appears on the box—otherwise it is not "Prang."

"Prang" Water Colors and "Prang" Crayons are manufactured and owned only by The American Crayon Company. It alone is the original source of supply.

The
AMERICAN CRAYON COMPANY
NEW YORK · DALLAS · SAN FRANCISCO

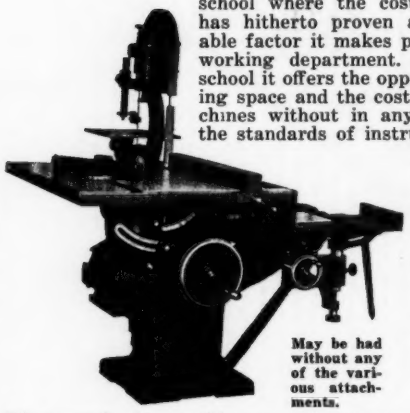
HOME OFFICE AND FACTORIES

"Old Faithful

101 HAYES AVENUE SANDUSKY · OHIO

On the Job in Schools thru-out the Nation

The great number of Tannewitz Combination Wood Workers in use in both large and small schools throughout the country is conclusive proof of their ultra practicality. In the small school where the cost of equipment has hitherto proven an insurmountable factor it makes possible a woodworking department. To the large school it offers the opportunity of saving space and the cost of several machines without in any way lowering the standards of instruction.



May be had without any of the various attachments.

It will rip, cross - cut — mitre — bevel — groove — joint — dado — rabbet — plane — band saw — mould — mortise and bore.

It's a man's size machine on which three people can work simultaneously with absolute convenience and an unusual degree of safety; quality built in every detail — 2 H.P. Motor — ball bearing throughout — completely guarded — attachments put in motion without shifting belts.

To fully appreciate this machine study it in detail. Write for bulletin E-2.

THE TANNEWITZ WORKS

FRONT AVE. GRAND RAPIDS, MICH.

Improve Your Shop Equipment

Huther Bros. Dado Head

A Huther Brothers Dado Head will speed up and simplify your intricate cutting and grooving. It consists of two outside cutters and enough inside cutters to perform the required cut. The cutters can be used in pairs or in any combinations desired.

Huther Bros. Cutter Head

Huther Brothers Round Cutter Head is especially desirable for jointing and running light mouldings on saw mandrels. The knives are set with the use of a headless set screw and flanged side plates strengthen the head and keep knives from twisting while being set.

HUTHER BROTHERS SAW MANUFACTURING COMPANY

Rochester, N. Y.

Makers of Better Saws for More Than 50 Years

Write for catalog No. 46 illustrating and describing the entire Huther Line.

BUESCHER True Tone BAND INSTRUMENT CO.

Replaces Glue Pots

"We have over thirty STA-WARM electric glue pots in our case department, which have been in service as long as three years. These glue pots have given perfect service and proven much better and stand up better than any other electric glue pot we have tried. As our other glue pots give out we are replacing them with STA-WARM equipment."

BUESCHER BAND INSTRUMENT CO.
Elkhart, Indiana.

Sta-Warm

Electric Glue Pots

Will Solve Your Gluing Problems Forever.

Write for prices.

STA-WARM ELECTRIC HEATER CORPORATION
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Always Specify Genuine
TRADE MARK
"Jorgensen"
REG U S PAT OFF
The Recognized Standard

Steel Spindles
Steel Nuts
Maple Jaws

Adjustable or Nonadjustable
12 Sizes

Write for our Catalog No. 5-EE or ask your dealer.

ADJUSTABLE CLAMP CO.
424 N. Ashland Ave., Chicago, Ill.

BISON BRAND GLUE

100% Adhesiveness

A superior adhesive manufactured by the same process as Pure Food Gelatine, under ideal climatic conditions. This process, and the careful selection of raw material, yields a glue of 100% adhesive matter.

The most vital consideration in buying glue is its keeping properties. The BISON BRAND being 100% pure, its keeping properties are guaranteed.

The unusual adhesive strength and penetrating qualities make it an ideal glue for all requirements of the woodworking industry and school shops.

Uniformity is guaranteed.

Liberal working sample submitted upon request, in Sheet, Flake or Ground form.

HENRY WILHELM COMPANY, INC.

134-136 Tenth Street PITTSBURGH, PA.

NEW BOOKS

Joints and How They Are Made.
By Wm. W. Kienke. Cloth, $0.85. Manual Arts Press, Peoria, Ill.

This book is intended as a text for students of manual training high schools, trade, vocational, and normal schools; as a help to the manual training instructor and a guide to the draftsman and architect; also as a means of assistance to amateurs to whom the work appeals. It describes and illustrates the making of common joints for practically every ordinary type of construction.

Junior Typewriting Studies.
By William E. Harned. Cloth, 93 pages. Price, $1.32. Ginn & Co., Boston, Mass.

Junior Typewriting Studies is a course in touch typewriting, designed primarily to meet the special interests, needs, and capacities of junior high school age.

The book aims to fulfill four educational purposes in typewriting, namely, the establishment of efficient and economical habits in technical skill; the development of accuracy in observation and action; the union of thinking with doing; the acquirement of practical information having educative value.

The book takes up such phases of the subject as art work in typewriting, touch typewriting exercises, even shading and effective display, paragraphing, writing sums of money, centering headings, the tabulator and indentions, financial statements, making corrections, artistic display of English compositions, special signs and characters, and adaptation of typewriting contest rules to junior school work.

The text is interspersed throughout with practical applications of the rules for writing English, the solution of problems, and the exercise of judgment. There is a teachers' record card and a typewriter chart for a standard keyboard.

PUBLICATIONS RECEIVED

The Value of Retail Store Service. By Howard L. Briggs and Catherine L. Kerr. Issued by the Department of Vocational Education of the public schools of Cleveland, O. The bulletin has been prepared for the purpose of furnishing in compact form definite information concerning the opportunities for placement, made available to high school students through retail store service. It discusses the length and character of the course, and the opportunities for advancement.

A Billion Dollar Business With a Future. Issued by the Cleveland Automobile Manufacturers' Association, Cleveland, O. The pamphlet discusses the opportunity to be found in the vocational school for automobile mechanics, and shows how it is possible for young men to earn money while learning this excellent business in school. Good, practical knowledge of the trade is offered, as well as pay while finishing school. Full time pay for the school period is given during the third year.

Cleveland Plan for Training Painters' Apprentices. By Earl D. Flood. Issued by the Painters' Apprentice Committee, Cleveland, O. The pamphlet describes the organization of the painters' and decorators' apprenticeship system and offers an outline of the plan under which the present system is operating. The school has 78 boys in attendance and the work is all carried out in a downtown building of factory construction. Benches and tools are provided for theory and lecture work.

Under the plan, an apprentice who finishes a three-year course has sufficient knowledge of exterior and interior painting to be able to obtain a position in any city of the country. In addition to a diploma, he has an indenture contract, a certificate stating his physical fitness at the end of the second year, and another after the third year. Armed with these forms of evidence he enters the field of journeyman with proof that he is able-bodied, that he knows his trade, and that he is a more able workman because of the training received.

Feuerstein Unit Plan of Organized, Diversified, Activities in Industrial and Practical Arts, with Tentative Courses of Study. By Harold Feuerstein. Issued by Harold Feuerstein, 21 Arrandale Ave., Great Neck, L. I., New York. The bulletin aims to arouse interest in the diversified shop plan and to demonstrate the great superiority in the subject matter, content, reasons, and necessity for the elimination of the old-time woodworking shops. The plan described has been in operation for two years and has been thoroughly tried out. It is believed the plan attracts more attention than the usual comments made by the dyed in the wool group of shop teachers. The courses cover automobile mechanics, concrete construction, electricity, mechanical drawing, photography, sheet metal work, and woodwork.

Handbook of Etiquette. Senior High School, Dubuque, Ia. Compiled by the house of representatives and printed by the classes in printing at Dubuque, Ia. The material was contributed by the students, and takes up etiquette in the auditorium, the cafeteria, the classroom, the corridor, the gymnasium, the library, the study room, and on the street. The booklet was designed, set up, printed and bound by the students of the printing department.

Proceedings of the National Conference on Vocational Rehabilitation of the Disabled Civilian. Bulletin No. 104, Rehabilitation Series No. 10, October, 1925, issued by the Federal Board for Vocational Education, Washington, D. C.

The Printshop of the Joliet Township High School, Joliet, Ill. The pamphlet is a small folder telling about the work of the Joliet school printshop and giving a list of the equipment in general use. The pamphlet is illustrated with typical views of the shop showing the equipment in use.

Job Sheets in Mechanical Drawing. A series of job sheets in mechanical drawing has been prepared by Mr. R. J. Coyle, instructor in the Roosevelt Junior High School, Wichita, Kans. The job sheets have been printed and are being used by the students.

Mr. M. W. Smith, an instructor in the vocational machine shop at Wichita, has turned out a substantial bench vise. An-

When you are in need
Of
TOOLS--MATERIALS AND SUPPLIES
For
VOCATIONAL SCHOOL USE

AND WANT IMMEDIATE SHIPMENT,
A WIRE, TELEPHONE OR LETTER
WILL BRING RESULTS

Industrial School Service
By
LUSSKY, WHITE & COOLIDGE, INC.
65 TO 71 W. LAKE STREET
CHICAGO

other piece of work was the building of saw tables for manual training shops.

Occupations for Cardiacs. Some suggestions for suitable occupations for those suffering from disease of the heart. Issued by the Association for the Prevention and Relief of Heart Disease, 370 Seventh Ave., New York City. The majority of cardiacs are able to work and earn their own living and many of them are able to perform even the hardest labor without doing themselves harm. The present pamphlet discusses danger from overstrain, choosing of a job, cooperation of employer, and change of occupation. It lists suitable occupations which may safely be engaged in by men and boys, and women and girls, and embracing both unskilled and semi-skilled work.

Making Steel. The Inland Steel Company, of Indiana Harbor, Ind., has issued an eighteen-page booklet under the title of "Making Steel." The booklet is written in a simple, clear style, tracing the manufacture of steel through the different stages of development, from the blast furnace to the open hearth, to the blooming mill, the plate mill, and finally the finishing department.

The booklet avoids technical terms, and will serve as an excellent supplementary text for shop classes.

An Achievement. The March number of "Beach Leaves," the monthly magazine written, printed, and sold by the students of the Oshkosh Vocational School, Oshkosh, Wisconsin, is entitled "Issue of the Americanization Classes." The content of the paper is so different from ordinary school periodicals that it is worthy of notice. The entire work of issuing the paper, from the preparation of the manuscript to the distribution of the copies, including the setting of the type, the press work, etc., was done by immigrants who are members of the Americanization classes at the night school and who undertook the task as a part of their course in English. The only contribution which did not come from students of the classes is the leading editorial, which was written by Mr. D. H. Wright, principal of the night school. The work was carried on under the direction of Mr. A. M. Bleyer, director of shop classes, and Miss Lucille Evans, teacher of English. It would do credit to any advanced high school class.

Analysis of the Plasterer's Trade. By Melvin S. Lewis. Division Bulletin No. 15, Trade and Industrial Series No. 3, 1924. Price, 40 cents. Issued by the University of California, Berkeley. Plastering is one of the old building arts which is once more taking its place among the building arts. Mr. Lewis, in his analysis of the plasterer's trade, has included a whole gamut of activities in the trade. He has set a standard of trade analysis which future students in the field will find it difficult to surpass. The analysis is intended to assist teachers of plastering who are already skilled men in the trade. It should find a wide use in schools and classes for training in any branch of the plasterer's trade and it should prove useful to those responsible for outlining and teaching courses for workers on a short-unit basis.

Organization and Courses of Study in Anthracite Coal Mining for Mine Foremen and Assistant Mine Foremen. Bulletin No. 6, 1925. Issued by the Department of Public Instruction, Harrisburg, Pa. The bulletin was prepared by Mr. W. P. Loomis, under the direction of L. H. Dennis, and has been prepared to assist school districts in organizing courses of study and conducting evening classes that will help prospective mine foremen and assistants in meeting the requirements of the state mining law.

Mr. Lawrence Hurst, head of the history department of Stout Institute, Menomonie, Wis., since 1919, has resigned to accept a professorship at Ball College, Muncie, Ind. Mr. Hurst has had an active part in the work of Stout Institute since he took up his work in 1919. He has been chairman of the industrial arts department of the credits committee, chairman of the lyceum committee, and adviser of the senior class.

Mr. R. A. McGee, instructor in carpentry and wood finishing at Stout Institute, has accepted another position for the next school year. Mr. McGee will teach in the vocational department of the University of Minnesota and will at the same time pursue work toward a master of science degree.

High Schools to Teach Trades. Dr. James Sullivan, assistant commissioner of education in charge of secondary schools of New York State, has indicated in a letter to all high school principals of the state that the purely academic or college preparatory high school is to be gradually eliminated, and in its place will come the combined general and vocational school teaching one or more trades.

Dr. Sullivan points out that only twelve per cent of the high school graduates enter institutions of higher learning, and only 22 per cent of those entering the high schools complete the course. He emphasizes that those who enter the high schools and drop out, or if graduated, do not enter the normal school, college or university, should receive training that will fit them as far as possible for the work they will perform. He points out that it will not be possible for all schools to offer all types of courses or to provide a wide variety of occupations, but each high school should offer, in addition to its college entrance curriculum, at least one vocational curriculum for boys, and one for girls.

Such courses to be effective, must represent the dominant occupations of the community and provide training of such a character that pupils upon graduation may find profitable employment in or near the community.

Principals have been asked to give the matter of the extension of their curriculum offerings serious thought and attention. It is recommended that principals make a systematic analysis of the dominant occupations in the patronage area of the school, and the extent to which persons vocationally trained may find profitable employment in or near the community.

Your Students Can Make These Art-Fibre Furniture Projects Without The Aid of Any Special Tool Equipment

ART-FIBRE Furniture Weaving offers more for less than any similar art chiefly because hand training and co-ordination of mind and muscle, so important in child training, are the direct results of a course in this interest-inspiring activity.

Furniture weaving is entirely hand work and each student completes his or her project which can be of their own choosing because the fundamental principles are the same and the same supervision will suffice for many projects.

Art-Fibre Furniture Weaving is easy to learn and to teach, and gives you a medium through which you can develop public interest in your shop activities.

WE SUPPLY ALL MATERIALS FOR WEAVING AND FINISHING MORE THAN 100 PROJECTS.

Frames are shipped knocked-down with all holes properly bored and mortises cut and fitted for quick and accurate assembling. Fixtures, upholstered cushions and all necessary weaving and finishing materials can be supplied in the correct amounts complete for each design, or you may order the various items as separate units in any quantity.

NEW COMPLETE TEXTBOOK DESCRIBING 100 PROJECTS FREE ON REQUEST WITH AN ORDER OF $10 OR MORE.

Contains 164 pages, illustrates and describes more than 100 projects ranging from footstools to complete suites of furniture. All basket and furniture weaves are clearly explained with progressive illustrations. A most complete text that simplifies your work.

Student's Edition (illustrated) given free on request with an order of $10 or more.

DeLuxe Edition (cloth, gold-embossed cover, super binding), $1.25 a copy postpaid.

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NEWS OF THE MANUFACTURERS

Pease Peerless Blueprinting Equipments. The C. F. Pease Company of Chicago, Ill., has issued a book of 362 pages, describing and illustrating the Pease blueprinting machinery, blueprint paper, accessories, drafting room supplies and furniture, drawing and surveying instruments.

The Pease process of automatically printing, washing, and drying by one continuous operation is accepted as the most efficient and economical method of making blueprints. The Pease machines have met with the unqualified approval of commercial blueprinters, architects, technical schools and colleges, as well as government experts.

The blueprinting machine is designed to produce a large quantity of blueprints at the lowest possible cost for operation and maintenance. It has a printing speed of four inches to six feet per minute and is regulated by means of a rheostat at the right hand end of the printer. The output is about 120 linear yards per hour, which is as fast as an operator can properly feed the tracings. The machine may be equipped with a double cut worm at additional cost, to print over 200 yards per hour, but the higher rate of speed is not recommended. The printing machine may be used independent of the washer and dryer when desired, merely by throwing out of engagement a clutch on the washer, which enables the operator to run through a few emergency prints at a moment's notice.

The entire equipment occupies a space only six and one-half feet long by the width of the machine; it is quiet in operation, and free from dirt and other objectionable features.

The firm also manufactures the Pease junior blueprinting machine and junior sheet washer for use where only a small quantity of blueprints is required, or where emergency prints are wanted in a hurry. It will be found useful for vocational schools, high schools, and junior high schools. It occupies a floor space of only 22x26 inches, and produces perfect prints in one minute, with one drop of the lamp, using a 220-volt direct or alternating current lamp. A sheet washer has been especially designed for use with the junior blueprinting machine.

Information concerning the Pease blueprinting equipments may be obtained by writing to the Pease Company at 813 No. Franklin St., Chicago, Ill.

Munsell School of Color. The Munsell Research Laboratory is offering for the first time courses of instruction covering the theory and application of color. The school which is an experiment of the laboratory for teaching the principles of the Munsell system, will be conducted from June 30th to August 11th, at Meredith, N. H. It will be limited to thirty pupils and will comprise an elementary course of six weeks; an advanced course of six weeks; a special industrial course of two weeks, and a series of informal conferences on subjects suggested by students.

The tuition is $40 for the elementary course, $50 for the advanced course, and $25 for the special course of two weeks.

Change in Firm Name. The Columbian Hardware Company, Cleveland, O., has changed its name to the Columbian Vise and Mfg. Company. The new name better describes the products of the firm, which include metal working and woodworking vises.

PERSONAL NEWS

Mr. S. Francis James, formerly director of art at the Illinois Normal University, Normal, Ill., has been appointed to a similar position in the art school and museum at Fort Wayne, Ind. The position offers a wider field of work.

Mr. Herb Heilig, of Appleton, Wis., has been elected president of the Association of Wisconsin Vocational Directors, following a meeting of the association at Madison. Other officers elected were: Otto J. Dorr, Fond du Lac, vice-president, and Charles Beardsley, Eau Claire, secretary.

Mr. H. J. Wilson, of Hornell, N. Y., has been appointed director of vocational education at Watertown, to succeed F. L. Adkins.

Mr. Herman Hjorth, of New York City, has been appointed as instructor in architectural construction at the Saunders Trade School, Yonkers, N. Y. During the first year Mr. Hjorth will teach classes in trade woodworking, and the following year he will conduct a laboratory which is in process of construction.

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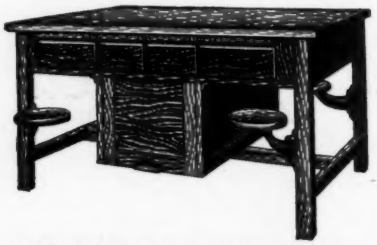

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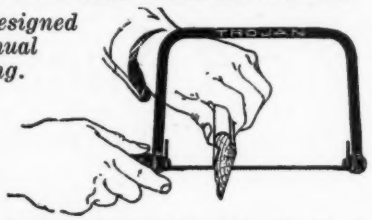

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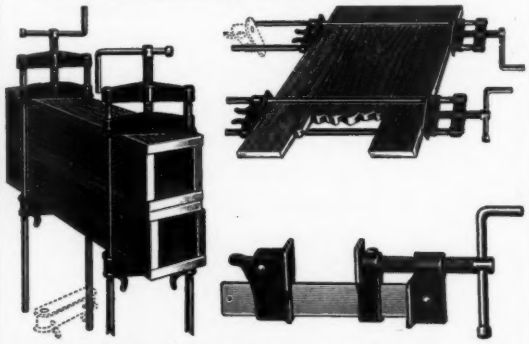

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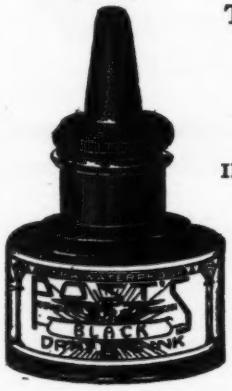

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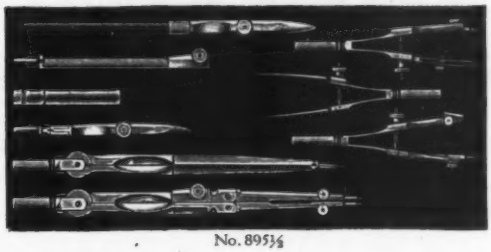

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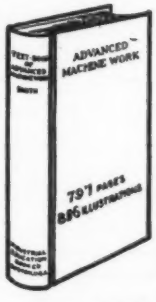

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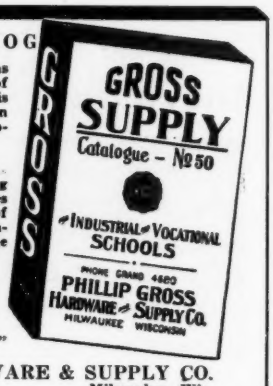

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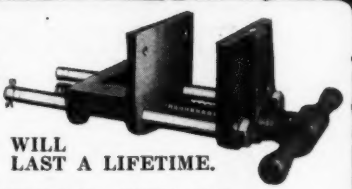

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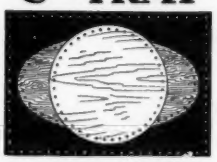

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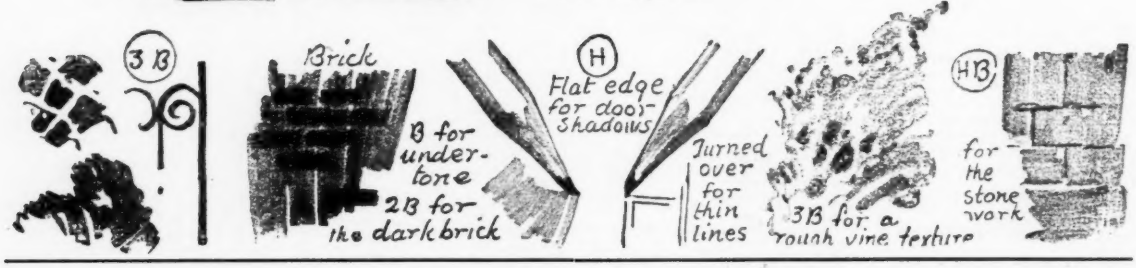
THE ELDORADO PAGE

Sketching with "the master drawing pencil"

The White Door

A WHITE door set in a wall of low-toned brick is one of the choicest delights to be found in domestic architecture. *Contrast* is the basis of this effect. Make the surrounding wall dark enough. Keep the wood free from tone where the sun floods it. Omit all but the essential details of the door. The shadow on the door is vital. It must be the right value. And its edge should be sharp—a hazy edge here would spell failure. Eat right into the paper with the 3B "Eldorado" Pencil to give the "pep" which the iron railing should contribute to the sketch. The vine provides a graceful stop for the drawing at the left. The vignette must do the trick at the right.



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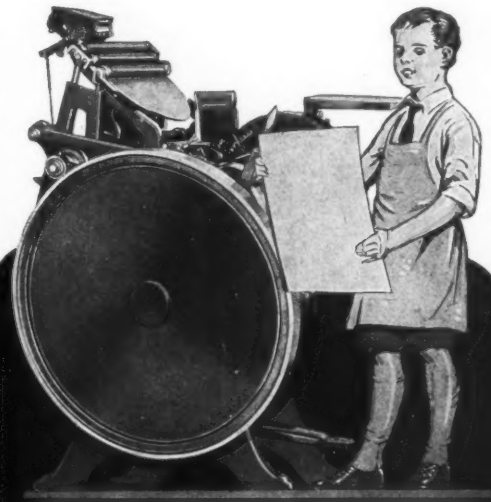

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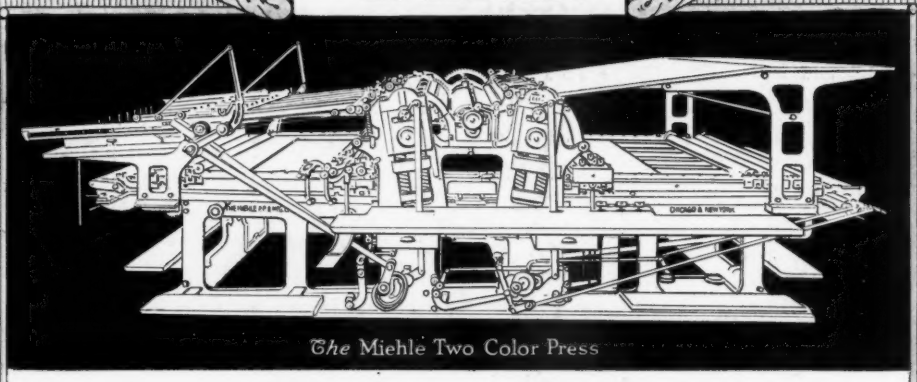

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